ARTISAN

In This Issue

• Paid in Full does not always mean what it implies. Albert W. Gray cites fundamentals of law which govern. Page 64.

• A new series by S. Konzo explains the electrical resistance concept of heat transmission through building materials. Permanent reference material. Part I starts on Page 78.

• Rogers Follansbee presents latest developments on the design of warm air perimeter heating. Page 83.

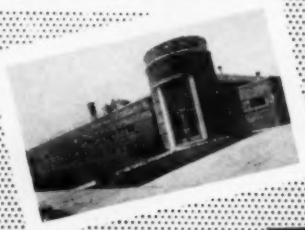
The Cover Picture

James W. Brill, left, analyzes furnace efficiency as Harvey Ziehm, Chicago contractor looks on. Instruments record cycling of burner and blower. Page 86.

JACKSON & CHURCH

warm air heat

Cuts costs . . .
Saves critical materials



Cut the high cost of heating! Compare advantages and savings of Jackson & Church Warm Air Heat against natural convection heat and see why dealers, builders and architects are able to cut costs and conserve critical materials.

In addition to lower installation and operating costs, Jackson & Church Warm Air Furnaces offer many other money-saving advantages. In most cases, warm air heat PLUS summer air-conditioning can be had for the same approximate cost as convection heating alone.

Over 100 J-C models are available in a range of sizes from 50,000 Btu to 3,800,000 Btu output . . . designed to provide dependable, healthful heating for every residential, commercial and industrial use.

For the more difficult heating installations, our engineering department is at your service to assist with heating plans. If you are interested as an architect, as a dealer, builder or consumer, write today for further details.

J-C Installations Were Chosen For These Buildings In The Midwest Area

SEE OUR CATALOG IN SWEET'S

. . AMERICA'S LARGEST AND MOST COMPLETE WARM AIR HEATING LINE . . .

J-C JACKSON & CHURCH CO.

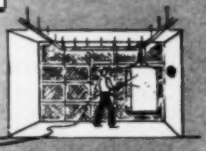
SAGINAW, MICHIGAN

WORK WELL DONE SINCE '81

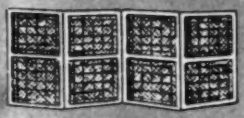
THERE'S AN RP *Air Filter for:*

FORCED WARM AIR FURNACES

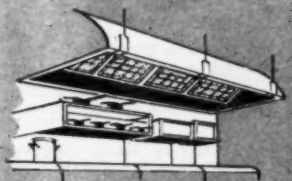
UNIT AIR CONDITIONERS



PAINT SPRAY BOOTH



CENTRAL SYSTEM FILTER BANKS



KITCHEN GREASE CANOPIES

ENGINE INTAKE

SPECIAL PURPOSE DESIGNS

Tell us your Air Filter needs and specifications

THIS IS THE THIRD HALF-EATEN MEAL I'VE BROUGHT BACK TONIGHT--WHAT'S GOING ON?
I CAN'T HELP IT--THIS PLACE IS SO GREASY, IT DRIPS--AND IT ALL GETS IN THE FOOD. I'M GONNA SEE THE BOSS!
I CAN'T KEEP GREASE OUT OF THE FOOD-IT COLLECTS AS FAST AS I WIPE IT OFF!
I'M GOING TO CALL THE SHEET METAL SHOP
I BROUGHT THE R-P MAN ALONG-HE'S GOT A REMEDY FOR THIS GREASE SITUATION
WHY, YOU NEED SOME R-P GREASE FILTERS INSTALLED--THEY'LL CATCH AND HOLD ALL THAT GREASE--AND PROTECT YOUR EXHAUST FAN TOO!
6 MONTHS LATER
WE'VE REALLY HAD BUSINESS SINCE THE R-P MAN AND THE SHEET METAL PEOPLE GOT TOGETHER AND LICKED OUR GREASE PROBLEM.

Write RESEARCH PRODUCTS CORP., Madison, Wis., U. S. A.

RP . . . PRODUCTS OF RESEARCH

WASHABLE AND REPLACEMENT AIR FILTERS • GREASE FILTERS
EVAPORATIVE COOLER MATERIALS

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING

WARM AIR HEATING

SHEET METAL CONTRACTING

Member—Audit Bureau of Circulations
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Merged with American Artisan are "Warm Air Heating" and "Furnaces and Sheet Metals"

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Founded 1864

APRIL, 1951

Volume 88, No. 4

Syncromatic

LEADER... IN ENGINEERED WARM AIR HEATING EQUIPMENT

GIVES YOU

OIL HIGHBOY
85,000 B.T.U.

GAS HIGHBOY
75-100,000 B.T.U.

Syncromatic COUNTER FLOW

EFFICIENCY

It costs *a lot less* to heat with a syncromatic.

Syncromatic employs its patented Counter-Flow design which literally "scrubs" the heat units out of combustion gases.

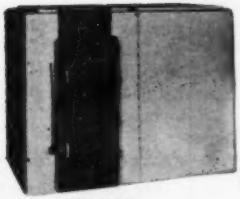
STABILITY

All Syncromatic heat exchangers, whether coal, gas or oil, are made from heavy gauge steel to give your furnace added insurance for safety and long life.

G.F.B. 410-11

A COMPLETE

Line for all fuels and in ratings from 60,000 B.T.U. to 1,000,000 B.T.U.



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Coal Gravity or Forced Air
90,000 to 250,000 B.T.U.

700 DE LUXE SERIES
110,000 and 146,000 B.T.U.

HI-CAP
OIL—GAS—COAL • 10 SIZES
330,000 to 1,000,000 B.T.U.

MANUFACTURED BY

Syncromatic Corporation
WATERTOWN, WISCONSIN

1931 — 20th YEAR — 1951

the editor's notebook

No. 1 Choice

The public's preference for home heating systems continues to swing to warm air. This preference can easily be seen by comparing the percentage increase in warm air heating units produced during 1949 and 1950 with the number of housing starts during the same year.

According to the U. S. Department of Labor, preliminary estimates indicate that a record-smashing 1,400,000 housing units were started during 1950 by the nation's home builders. This total exceeds the 1949 record volume of 1,025,100 units by 36 per cent. In the warm air heating industry a furnace shipment record was also established during 1950. Bureau of Census figures show that 1,093,189 furnaces were shipped, compared to 717,000 in 1949.

Metal Curbs

Latest cuts in metals for civilian use, including a 20 per cent slash in steel for automobiles and other consumer goods effective April 1, will make a big dent in non-defense production but not so great as had been anticipated.

Administrator Manley Fleischmann of the National Production Authority said original plans called for cuts ranging from 25 to 40 per cent during the second quarter of 1951, but they were changed because of the possibility of people being thrown out of work.

NPA said steel will probably be cut up to 30 per cent on July 1 and maybe again later in the year.

Other cuts in non-defense production include copper and aluminum. The copper slash of 25 per cent on April 1 is 5 per cent more than a previous cut ordered for March. Already reduced 35 per cent for March, aluminum will be cut the same through June.

Reductions are based on the amount of metals used in the first half of 1950 and are supposed to provide approximately 1,000,000 additional tons of steel for defense and defense-supporting projects during the second quarter of 1951.

Sentry
REMOTE and DIRECT READING
TANK GAUGES

FOR BASEMENT TANKS: Type D-O for 2" openings. Type D-10 for 1½" openings.
For accurate, easy reading of tanks — indoors, outside or underground.
AT-A-GLANCE
OIL GAUGE
FOR UNDERGROUND TANKS: Type D-U, shown at right, for 2" openings only.
Left: Standard type At-A-Glance Gauge for direct reading at storage tank. Also available with special fitting for use and adaptation with remote gauge indicators to permit dual readings — both at tank and outside.

Dependable, Inexpensive, Weatherproof... Simple Mechanical GAUGES, Easy to Install

Accurately indicates liquid level in remote storage tanks at all times — Not affected by specific gravity oil changes or variations. Simplified mechanical operation eliminates unnecessary fittings, bulbs or levers for oil men to tamper with — no need for access to building. Can be installed for dual location readings — indoors and out. Non-corrosive stainless steel and brass extension lines connect tank float with cast aluminum, weatherproof, thermometer type indicator — calibrated in fractions. Easy to read, unconditionally guaranteed. Write for folder showing complete line.

KRUEGER Sentry GAUGES
GREEN BAY • WISCONSIN

the editor's notebook

Spring Cleaning

Experience of contractors across the nation has shown that an active spring and summer furnace cleaning campaign pays off in immediate revenue and also keeps satisfied customers for another heating season. To help with such campaigns, Coal Heating Service Division has available sales material that promotes furnace cleaning and summer conditioning. There are postcards and stuffers of various types which can be effectively used to sell these services. Orders should be placed in time to allow for imprinting and shipping. Samples and order blanks can be obtained from Coal Heating Service, 802 Southern Bldg., Washington 5, D. C.

Procurement Information

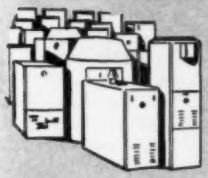
The Small Business Division of the U. S. Department of Commerce makes available, through its 42 field offices and many cooperating offices, general Government procurement information.

The procurement assistance program provides information on Government specifications, possible subcontracting opportunities, general procurement data, and a day to day report of proposed purchases.

maybe YOU *should sell*

FURNACES • AIR CONDITIONERS

Let WEIR-MEYER *dealers* tell you why:*



COMPLETE LINE...

"With WEIR-MEYER's complete line of 114 units and burners I go after business anywhere and everywhere. I can sell any fuel, any size installation. I never have to turn down a job."

—Iowa

SPECIAL SALES AIDS...

"I know of 30 sales I made last year through WEIR-MEYER help. Besides national ads and local newspaper and radio, there are many special aids—a plan to sell architects and consulting engineers—for direct mail I just send in my prospects to get 3 free mailings sent to each—a Furnace Service Campaign that opens doors to me. These and other aids are on a share-the-cost basis! That's the kind of help I like."

—Maine

CUSTOMER SATISFACTION...

"WEIR-MEYER really satisfies owners. Seems like every customer I installed a furnace for last year gave me 3 or 4 good prospects."

—Indiana

**Names on request.*

PROMISES KEPT...

"Even though I just took on WEIR-MEYER last year, I've been getting good delivery on every order. When the WEIR-MEYER people make a promise, they keep it!"

—Ohio

PRACTICAL HELP...

"I do nearly half the warm air business in my town of 30,000, thanks to 12 years with WEIR-MEYER—and to the WEIR-MEYER representative. He's helped me to set up a bookkeeping system, pick and train salesmen, sell difficult prospects, solve tough service problems, and, this year, organize my WEIR-MEYER Furnace Service Campaign."

—Illinois

This coupon brings you full details on WEIR-MEYER —and the possibility of a protected dealership for you. Find out if you qualify for rights to WEIR-MEYER in your territory.

Send coupon now—no obligation.

The WEIR-MEYER dealer is a

"Preferred Person"

85 YEARS — THE MEYER FURNACE COMPANY, PEORIA, ILL. — HEATING SATISFACTION

MEYER FURNACE CO.
DEPT. D-12 Peoria 2, Ill.

Please rush information on Weir-Meyer Dealerships.

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Street .....

City ..... State .....

THE MEYER FURNACE COMPANY • General Offices: Peoria 2, Illinois

Manufacturers of Weir & Meyer Furnaces • Air Conditioners for Gas—Oil—Coal • Factories: Peoria and Peru, Illinois

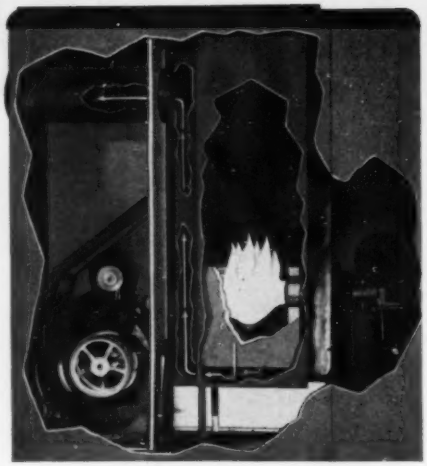
This information may be obtained in your home community at 1) a regional or district office of the Department of Commerce, and 2) the day to day report of proposed purchases is available at one of hundreds of cooperating offices located in other cities throughout the country. Among the largest number of cooperating offices are local chambers of commerce, associations of commerce, manufacturers' associations, businessmen's associations, and industrial development organizations. Trade associations are also among the cooperating offices. In cities where procurement information of this kind is not now available, the local business or industrial association may become a cooperating office by making application to the nearest regional office of the Department of Commerce. Trade associations may become cooperating offices for the benefit of their members and others in the same way.

Cost of Living

From August 1941 through August 1950 the index of the total cost of living as computed by the U. S. Bureau of Labor has risen from 106.2 per cent to 173.0 per cent of the 1935-39 average. The cost of utility services, according to a release from the American Gas Association, has not contributed to this sharp rise in living costs as is evidenced by the fact that in August 1941, the Bureau's index of the cost of gas and electricity stood at 97.1 per cent of the 1935-39 average and in August 1950 it stood at 97.0 per cent.

The cost of gas and electricity moved up in the ten year period only twice. In December 1949 and again in April 1950, the cost index of these utility services stood at 97.2 per cent or one tenth of one per cent above 1935-39 average. The index reached its lowest point in August 1946 when costs of gas and electricity had declined to 91.8 per cent of their 1935-39 average. In the same month the cost of living index stood at 144.1 per cent; food costs were 171.2 per cent; clothing costs stood at 161.2 per cent, and house furnishings were costing 160 per cent of the 1935-39 average.

DOUBLED GAS TRAVEL GIVES 50% MORE HEAT



Unique in furnace design, SUN HEATRAP more than doubles the distance hot gases travel from combustion chamber to outlet radiator. That's the secret of HEATRAP efficiency.

From the time the gases of combustion leave the firing chamber they're forced down and up and around the heat transfer chamber until 84% of their heat content has been squeezed out. By the time they leave the furnace all useful heat has been transferred to the warm air plenum to be utilized in greater home heating comfort. Easy to sell? Our backlog of orders says they are!

Sun FUEL MASTER

HEATRAP

Start new, profitable heating business coming YOUR way. Ask for literature and NEW LOW PRICES.

J. V. Patten Company

SYCAMORE, ILLINOIS, U. S. A.

ESTAB 1893 ★ INC 1928

the editor's notebook

NWAH&ACA Form 6

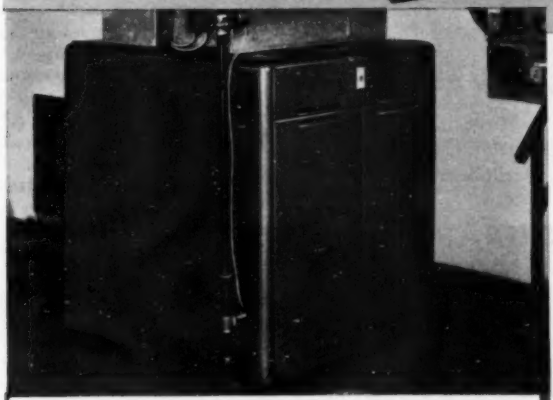
Form 6, Job Estimate Form for Warm Air Heating Systems, has been developed by the National Warm Air Heating and Air Conditioning Association to meet the demands made by heating contractors for a simple, short, and quick method to figure jobs for estimating purposes.

The first step in estimating the cost of installing a heating system is determining the size of furnace unit needed. This of course is dependent on the heat loss of the building. To determine the heat loss the association recommends the crackage method as the most accurate. This method is used with Form 6. However, it is greatly simplified by figuring the heat loss of the home as a whole instead if figuring heating requirements room by room. The number of warm air outlets required is obtained by then dividing the total heat loss of the house by the average Btuh delivery which the contractor wishes to use for each outlet. The factor 8,000 Btuh has been used in Form 6, which represents the preference

AMERICAN-Standard

First in heating...first in plumbing

Every home with an old basement like this is a prospect for an installation like this



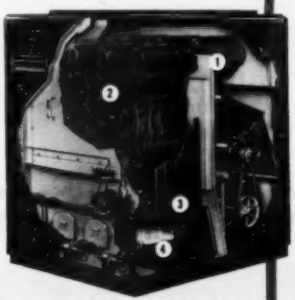
Heating Contractor: Bell Plumbing & Heating Co., Avalon, Pa.

These construction features win customers

1. PRE-HEATED AIR. The return air from rooms is drawn over these hot radiators. Thus the air is pre-heated before it enters the heating compartment—saving fuel, increasing efficiency.

2. CAST IRON HEATING ELEMENT. Made in two sections of durable cast iron. The faces of both sections are precision ground and packed with asbestos wicking to form a leakproof joint.

3. RADIATION SHIELD. Corrugated shield cuts heat loss into basement. Increases efficiency by providing extra heating surface. Placed between heating elements and at sides of end elements.



4. EFFICIENT BURNER. Made of cast iron with high temperature alloy, corrugated ribbons. Burns manufactured, natural, mixed, liquefied petroleum, and butane-air gas uniformly, efficiently and sparingly. Quiet and dependable.

• There are plenty of chilly homes in your community with shabby old basements. They are excellent prospects for new heating equipment. For example, the moderately priced Mohawk shown in the basement at left puts completely automatic gas fired winter air conditioning within the reach of practically all of your prospects.

The Mohawk is made in eight sizes, with capacities ranging from 80,000 to 300,000 Btu input per hour. Its beautiful, streamlined jacket, with smooth Forge Red finish will harmonize with the smartest basement decorative scheme. It will stand out on your sales floor. And when you point out the Mohawk's service and long life, you'll find this quality unit from the Sunbeam line easy to sell!

For full information about the gas fired Mohawk Winter Air Conditioner and other warm air heating equipment by American-Standard, contact your wholesale distributor. **American Radiator & Standard Sanitary Corp.**, P. O. Box 1226, Pittsburgh 30, Pa.

There's money in modernization jobs . . . and AMERICAN-Standard *has what you need to sell them!*

LOOK FOR THIS MARK OF MERIT

Serving home and industry: AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

of most dealers. Three tables are included in the form for use in determining the return air requirements for gravity and winter air conditioning systems and for perimeter warm air heating.

Space is provided on page 1 of the new form for indicating all information pertaining to the job so heating contractors can have an accurate record of items such as insulation, storm windows, and weatherstripping. Space is provided on page 4 for a complete tabulation of all costs figured in the estimate including special controls, carpentry, masonry, drayage, mileage, and even time necessary to properly clean up after the job is completed plus cost of free service plan.

Form 6 is priced at $6 per 100 and can be obtained from the National Warm Air Heating and Air Conditioning Association, 145 Public Square, Cleveland 14, Ohio.

Warm Air in the Arctic

A new prefabricated aluminum building designed for Arctic weather has been developed by the Engineer Research and Development Laboratory at Fort Belvoir, Va.

Intended primarily for housing troops in extremely cold climates, the building has its own oil fired forced air heating system which will maintain an indoor temperature of 70 F when outside temperature is −65 F.

Aluminum is used throughout the structure to reduce weight and facilitate erection. Side, roof, and floor panels have a honeycomb core faced on both sides with aluminum, providing maximum resistance to heat flow.

The warm air unit has sufficient capacity to provide stateside comfort and yet does not contribute materially to weight or detract from portability.

Sundstrand
All Electric
OIL BURNER

PRECISION-BUILT
for
CHAMPION
PERFORMANCE

ATTRACTIVE
Modern, functional design, with no cumbersome "extras"

DURABLE
Sturdy construction for long wear under any conditions

ECONOMICAL
Built to provide low initial cost and low operating cost

DEPENDABLE
Reputation for trouble-free operation throughout the years

QUIET
Heavy housing and cushion-mounted motor eliminate noise

A complete line, with consumer acceptance and a burner for every job. For full information, write:

SUNDSTRAND ENGINEERING CO.
ROCKFORD, ILLINOIS, U.S.A.

the editor's notebook

Making Way for Production

Under the pressure of high production and rapid expansion, steel companies are doing some unusual things.

One company is re-routing part of a river in order to gain room for a new mill building. Another company plans to cut apart one of its ore vessels and insert a large section amidship, in order to carry more iron ore. One firm had to move more than a score of houses in order to erect a new plant building. Another company may have to move a hundred residences.

A number of steel companies are participating in the construction of a 360 mile railroad which will carry iron ore in Quebec and Labrador.

The steel companies will expand their combined annual capacity to 117.5 million tons in 23 months, from 104 million tons at start of 1951. This may cost them more than $2.5 billion.

At numerous steel mills, production and construction must go on simultaneously with no halt to either.

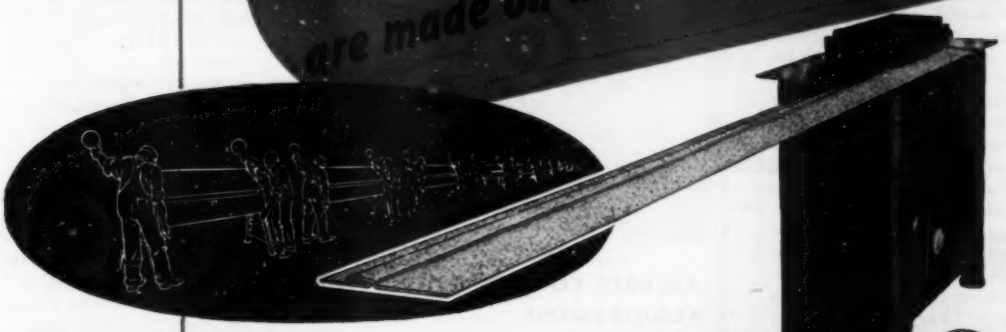
Changing Picture

Figures released by the Bureau of the Census show that home ownership increased by 54 per cent, or 8,200,000 units, in the period from 1940 to 1950. In 1950 owners exceeded renters for the first time since information on tenure has been collected. The shift from renter to owner occupancy was so great that there was a net decrease of about

..the best looking Pittsburghs are made on a LOCKFORMER

..the best fitting Pittsburghs are made on a LOCKFORMER

..the lowest cost Pittsburghs are made on a LOCKFORMER



16 MEN AND 8 BRAKES OR ONE MAN AND A LOCKFORMER

Write for Our Latest Catalog Today . . . .

Ease of assembly, perfect fit and top-notch appearance are just a few of the advantages of Lockformer-made Pittsburghs—*and you make them 15 to 20 times faster than on a hand brake!*

This tremendous saving in labor costs actually "pays back" the cost of your Lockformer quickly—continues to earn bigger "dividends", in extra profits, *than any other shop investment you can make!*

Based on the Industry-wide preference for the past thirteen years, the chances are better than 10 to 1 that you'll *eventually* have a Lockformer. Why not start taking advantage of Lockformer's earning capacity right away?

THE LOCKFORMER CO.

4615 WEST ROOSEVELT ROAD • CHICAGO 50, ILLINOIS

the editor's notebook

500,000 in the number of renters, even though a large volume of rental units were constructed since 1940.

Definitions

Most of us are concerned with words and we know how difficult it is sometimes to agree on specific meanings. In *Through The Looking Glass*, Humpty-Dumpty said when he used a word it meant just what he wanted it to mean, neither more nor less.

Apparently, the Kremlin has been reading Lewis Carroll, as unlikely as that may seem, for some of their definitions of pretty ordinary words are somewhat different than most of us believe. Harry Schwartz, professor of economics at Syracuse University, went to the trouble of analyzing some of them for the *New York Times*.

Here are just a couple as Mr. Schwartz found them in the latest edition of the *Dictionary of Foreign Words* issued by the Soviet government.

Bible: A collection of different legends, mutually contradictory and full of historical errors, issued by churches as a holy book.

Aggression: An armed attack by one of several imperialist states on another country for the goal of seizing territory and forcibly subordinating its population to a foreign state. For example, the treacherous attack of Fascist Germany on USSR in 1941.

Boy Scout: A member of a bourgeois children's organization having a military-political character in capitalist countries.

Capitalist: An owner of capital, exploiting hired workers.

Honesty isn't any policy at all; it's a state of mind or it isn't honesty.—Eugene L'Hote

BARBER COLMAN

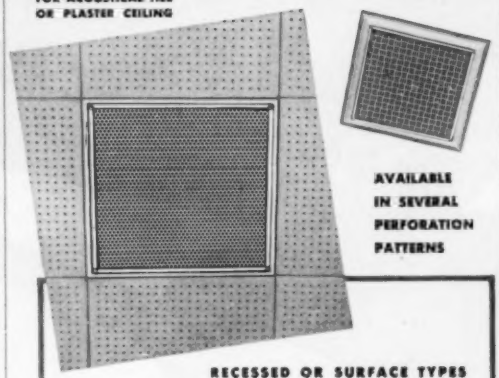
uni-flo

INCONSPICUOUS! FLEXIBLE!

THE ONLY

ADJUSTABLE SQUARE CEILING OUTLET

FOR ACOUSTICAL TILE OR PLASTER CEILING



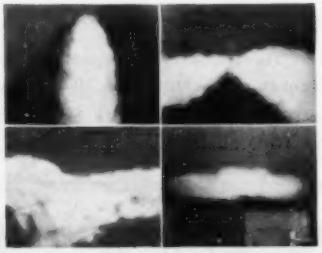
AVAILABLE IN SEVERAL PERFORATION PATTERNS

RECESSED OR SURFACE TYPES

ADJUSTS TO ANY DISTRIBUTION REQUIREMENT

UNI-FLO Square Ceiling Outlets are adjustable *on the job and after installation* to discharge air in one, two, three, or four directions and provide air patterns from vertical to horizontal as illustrated. Adjustments are easily made internally and *do not alter the outward appearance of the unit.* For ease in system balancing, opposed-blade, gang-operated volume controls are available. Actual tests in the laboratory and on the job prove the superior performance of the UNI-FLO Square Ceiling Outlet.

Write for Bulletin J-4728



BARBER COLMAN

BARBER-COLMAN COMPANY

1226 Rock Street • Rockford, Illinois

the editor's notebook

Aluminum in War

If you are wondering why the government has cut back the use of aluminum for civilian goods, take a look at a few of the many military uses for this metal: aircraft landing mats, tactical and floating bridges, helmets, rockets and other launching equipment, towers for creating the national radar screen, radar equipment, walkie talkies, fire control towers, portable shelters, mess kits, PT boats, submarines, water and fuel tanks, field kitchen equipment, firearms, medical field chests, and numerous other applications.

Our Readers Write. . .

• I would like very much for you to get the Residential Ventilation Guide for me. I just couldn't bring myself to cut the coupon out of my book as I keep them all in order for any reference that I may need.

I can truthfully say AMERICAN ARTISAN has been my best source of information on all the subjects that confront sheet metal and residential heating men.

C. C. CHAMBERS
C. Cosby Cluff, Orange, Va.

• We have read with interest the article in your January issue on sheet metal subcontracting. Possibly you can tell us where we should apply in order to secure some of this work. We have written a few letters, but so far have had no replies. We will appreciate any suggestions you can give us.

MYRL E. BECK
Beaumont Sheet Metal Co.
Beaumont, Calif.

A totalitarian state is one where everything is compulsory that is not forbidden.

THIS MONTH'S MERCHANDISING **IDEA**

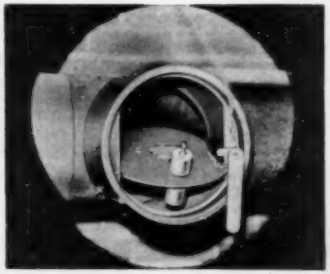
GET AN EXTRA PROFIT FROM SPRING CHECK-UPS

A service call can become a sales call, too, almost any time you take along a Field Barometric Draft Control. That's because every coal or oil-fired heating plant needs a draft control, worn out draft controls need to be replaced.

For hand-fired furnaces the Field BAROCHEK, combination check damper and draft control, means new fuel savings, reduced fire hazards, more even heat, longer furnace life, less furnace tending. Every hand-fired furnace should have one.

Field Controls offer a profitable business during the check-up season on oil-fired installations and assure maximum fuel economy for the home-owner. Display Field Draft Controls prominently in your store, carry them in your advertising, include Field stuffers in your monthly statements. Field Controls mean business for you.

A Field Draft Control display is an important salesman. Give it prominent space in your store, stack Field literature beside it.

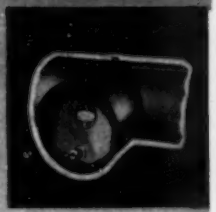


The Field Barochek, combination draft control and check damper for hand-fired furnaces made by Field Control Division, Mendota, Illinois.

field *means finest in* DRAFT CONTROLS

. . . . And There's A Field Control For Every Need!

field TYPE **M**



First and finest for all types of automatic heating equipment.

field TYPE **R**

First and finest for all types of space heaters and ranges.

field BAROCHEK

First and finest for hand-fired furnaces and boilers, a combination check damper and barometric draft control.

field FUEL SAVING SYSTEM

A newer, finer, more trouble-free damper-motor set with automatic spring reverse, built-in limit control, "smoke-switch", and booster fan switch.

WRITE for proof of why Field is First and Finest — first choice for the finest in heating equipment.

field CONTROL DIVISION

H. D. CONKEY & CO., MENDOTA, ILL.

AFFILIATES:

Conco Building Products, Inc.
Brick - Tile - Stone

Conco Materials Handling Division
Cranes - Hoists

you're a Triple Winner during the Kalamazoo Golden Jubilee

1st YOU SELL A Famous Brand Name!

A Household Name for 50 years—now featured by nationwide advertising reaching

30,000,000 people

Kalamazoo Heating Dealers and Wholesalers sell a well-known brand name that's been "pre-sold for you" by 50 years' of consistent national and local advertising!

Right now, exciting full color ads are telling America about the big Kalamazoo Golden Jubilee Contest.

Each month during April and May, a lucky person will receive a free Kalamazoo Gas-or-Oil Warm Air Conditioner plus a complete Kalamazoo Kitchen! Ten others will receive gas or electric ranges.

All they have to do is finish this simple sentence in 25 words or less—"A Kalamazoo Kitchen is really a Dream Kitchen because . . . . . ."

Your salesmen will be armed with contest entry blanks and wonderful Free Gifts for every contestant—handsome 48-page Recipe Books containing recipes from all over the world. They're sure-fire give-aways and door-openers that will make you really welcome!

2nd YOU CAN WIN Valuable FREE Prizes!

16 awards for Kalamazoo dealers turning in the most contest entries—

FIRST PRIZE consists of ALL 15 luxury gifts—a Giant Jackpot of 15 things every man has always wanted!

EACH OF THE NEXT 15 LUCKY WINNERS will receive an individual prize in this order: TV console, shotgun, camera, projector, iron set, wood set, wristwatch, tool chest, golf bag, golf balls, rod, reel, tackle box, pen set, lighter.

YES, one Grand Prize and 15 individual prizes for the 16 dealers signing up the most entrants. Easy—fair—no strings! Just induce as many people as possible to fill out entries and return them to you, whether they're:

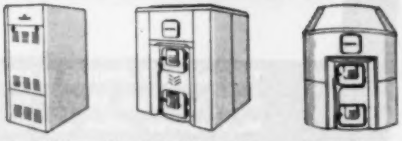
1. Entries from your newspaper ads
2. National magazine entries turned in to you
3. Official entries (or facsimiles) turned in to you

RCA VICTOR 19-IN. TELEVISION CONSOLE
REMINGTON "WINGMASTER" PUMP SHOTGUN
EASTMAN CINE-KODAK "RELIANT" 8mm CAMERA
EASTMAN KODASCOPE 8mm PROJECTOR
8 SAM SNEAD IRONS BY WILSON
4 SAM SNEAD WOODS BY WILSON
LORD ELGIN WRIST WATCH
FAMOUS STANLEY 23-PIECE TOOL CHEST
PAR-BAG FOR 14 CLUBS
SPAULDING "AIR-FLITE" GOLF BALLS
SHAKESPEARE BAIT CASTING ROD
SHAKESPEARE BAIT CASTING REEL
ROLL-A-TRAY TACKLE BOX
PARKER "21" MAGNETIX SET
RONSON "ADONIS" LIGHTER

3rd YOU SELL A Fast selling Line of Heating Equipment!

The Kalamazoo Line includes modern Oil, Gas and Coal Warm Air Conditioners and Gravity Furnaces, Gas and Oil Conversion Burners, Blowers, Filters, Fittings and Automatic Controls.

HEATING DEALERS AND HEATING WHOLESALERS!
Don't Delay—Your territory may still be available, so wire or write today to James Wetherbee, Kalamazoo Jubilee Dealership Information, 202 E. Michigan Ave., Kalamazoo, Michigan.



Gas-or-Oil Warm Air Conditioner — 3-Fuel Warm Air Conditioner — 3-Fuel Gravity Furnace

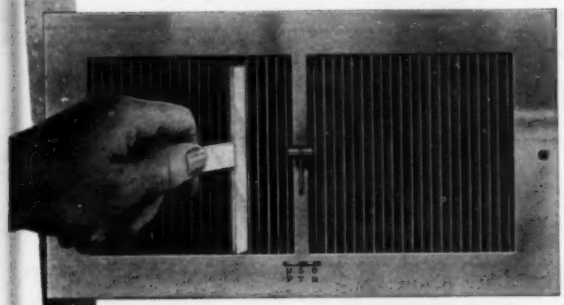
HEATING EQUIPMENT BY
KALAMAZOO
QUALITY LEADERS SINCE 1901

50TH YEAR KALAMAZOO GOLDEN JUBILEE

No. 75 DESIGN

THE AIR CONDITIONING REGISTER with the INCOMPARABLE *TURNING-BLADE* VALVE

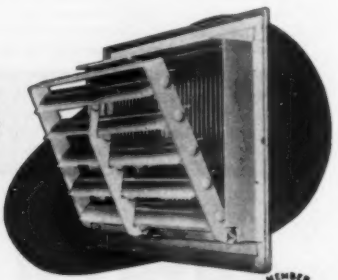
Used IN OVER 400,000 *Installations*



This almost unbelievable number of heating and air conditioning installations testifies to the overwhelming endorsement dealers have accorded this register. The outstanding results obtained with the No. 75 design in these 400,000 installations is proof that this register is far superior to any of the conventional registers of the multi-deflection type.

No other register has, or can employ the TURNING BLADE VALVE which is an exclusive H&C feature. When open this valve extends over practically the entire output area of the duct and its scientifically curved louvers divide the airflow and distribute it equally to all parts of the register face. This results in greatly reduced turbulence, much less resistance and better distribution of conditioned air to the farthest parts of the room. Consequently, regardless of register location, ideal diffusion of the air to every part of the room can be readily obtained by a simple directional adjustment of the face fins and valve. For Air Conditioning at its best, by all means use the H&C No. 75 — particularly since it costs not one cent more than the ordinary multi-deflection registers. Current catalog No. 51 and the eighth edition of our handy "Pocket Guide" describing the ideal register for every type of installation, will be sent on request.

This unique TURNING BLADE VALVE does what no single shutter or conventional Multi-louver valve can do. IT EVENLY DISTRIBUTES THE AIRFLOW TO ALL PARTS OF THE REGISTER FACE — PROVIDES BETTER AIR DISTRIBUTION TO THE FARTHEST PARTS OF THE ROOM.



HART & COOLEY MANUFACTURING COMPANY

500 EAST EIGHTH STREET, HOLLAND, MICHIGAN
IN CANADA: HART & COOLEY MFG CO., FT. ERIE, N. ONTARIO

MEMBER INDOOR COMFORT

WORLD'S LARGEST MANUFACTURERS OF REGISTERS, GRILLES, AND FURNACE ACCESSORIES

Hallmark of Quality

—that sells repeat contracts!

You do yourself and the building contractor a favor when you install genuine Hussey Copper Roofing and Drainage products on new construction or replacement work. New buyers and remodelers alike look for the lifetime assurance that copper gives. When you specify and use genuine Hussey Copper you are pre-selling repeat contracts from satisfied customers . . . eliminating complaints and call-backs.

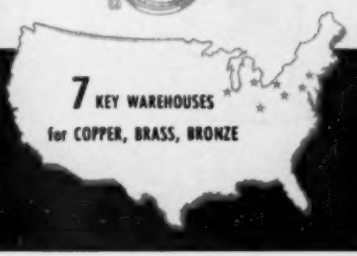
COPPER

ROOFING and DRAINAGE PRODUCTS

SHEETS
ROLLS
FLASHING
ROOFING
CONDUCTOR PIPE
EAVE TROUGHS
RIDGE ROLLS
FITTINGS
NAILS
BRACKETS & ACCESSORIES

C. G. HUSSEY & COMPANY
(Division of Copper Range Co.)
ROLLING MILLS AND GENERAL OFFICES: PITTSBURGH, PA.
Hussey Warehouses carry stocks of Copper and Brass Products for Prompt Shipment

7 convenient warehouses to serve you promptly!
PITTSBURGH, 2850 Second Avenue • CLEVELAND, 3318 St. Clair Avenue • NEW YORK, 140 Sixth Avenue • CHICAGO, 3900 N. Elston Avenue • ST. LOUIS, 1020 Delmar Boulevard • PHILADELPHIA, 1032 Fairmount Avenue • CINCINNATI, 424 Commercial Square



7 KEY WAREHOUSES
for COPPER, BRASS, BRONZE

You can't please everybody... but

you come closer to pleasing everybody with a — Waterbury

Look to Waterbury for a complete line of warm air heating equipment. If your prospect has an eye for beauty, the attractive Waterbury casings will please him. If he looks beyond the surface appearance, to the internal workings, that's fine, too, for "it's what's *under* the casing that counts" with Waterbury. There's a Waterbury for every size home and every type of fuel. And satisfied customers spread the word of Waterbury efficiency, economy and dependability. No wonder, then, that you can please nearly everybody with a Waterbury.

FURNACES—WINTER AIR CONDITIONERS
GAS CONVERSION BURNERS

OVER 44 YEARS OF WARM AIR HEATING

the WATERMAN-WATERBURY CO.

1122 JACKSON STREET NORTHEAST, MINNEAPOLIS 13, MINNESOTA

Using **Copper** wisely in **Building Design** and **Construction**

WRITE FOR DETAIL DRAWINGS
(Numbered for A.I.A. Filing)

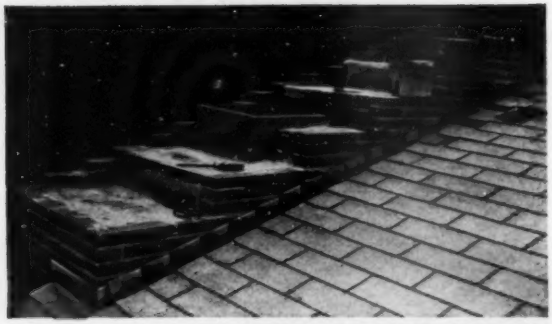
Construction details of copper flashings for this and many other types of chimney and roof designs are available on 8½" x 11" sheets convenient for filing. This is one of a series of advertisements presenting designs to illustrate how a little copper can go a long way in achieving good building construction.

Through-to-flue chimney flashing

RIGHT FROM THE START this flashing design provides a permanent barrier to water which seeps or is wind-driven through the porous brick and mortar. Water reaching the through-to-flue flashing can drain in only one direction—to the roof where it belongs.

And it isn't only a big architectural chimney, as pictured, that may cause trouble and expense unless properly flashed. The small ones are just as vulnerable and leaks are just as hard to locate and repair. Guard against this on your work . . . standardize on through-to-flue design.

For suggestions or counsel on any problem involving sheet copper and for detail drawings of this and other uses of sheet copper in building construction, write to The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.



1 Copper base flashing being installed. Note how flashing is interlaced with shingle courses.

2 Shop prefabricated cap flashing in position, through-to-flue.

3 Brickwork resumed. Space within will be filled with masonry rubble.

nothing serves like **ANACONDA®** **COPPER**

• ANOTHER REASON WHY SUNDSTRAND IS *FIRST* IN FUEL UNITS •

EVERY SUNDSTRAND FUEL UNIT MUST BE RIGHT!

No "spot-checking" here! Every unit gets a thorough check in these sound-proof booths, then is subjected to a 10-hour static pressure test for leakage.

In these booths . . . *complete* operating tests made on every Sundstrand unit.

No wonder Sundstrand Fuel Units are so free from service for years on end! In addition to inspection of parts after each precision operation, no assembled Sundstrand pump can leave the plant before it is run-in under high pressure, then accurately tested in this battery of acoustically-treated booths. Here, under *actual operating conditions*, each fuel unit must measure up to Sundstrand's high standards for capacity, efficiency, minimum pulsation, quick cut-off, low power consumption, and quietness of operation.

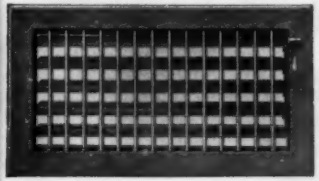
Get data and prices now on Sundstrand's two new basic units which handle all new equipment or replacement installations.

SUNDSTRAND

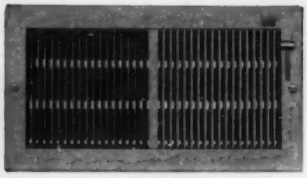
SUNDSTRAND FUEL UNITS

SUNDSTRAND MACHINE TOOL CO.
HYDRAULIC DIVISION, ROCKFORD, ILL.

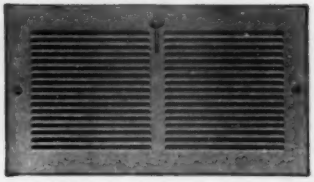
AUER REGISTERS and Grilles are as fine as any ever made anywhere. Not only on standard competitive quality items for average needs, such as simple gravity or forced air systems, but for multi-directional types and high velocity outlets for full air conditioning and cooling—our facilities are second to none. These products are uniformly well designed, fabricated and finished—a real credit to a first-class heating or air conditioning job.



No. 1005V-HML—Streamliner Register with single bank of vertical bars, multi-louvre shutters



No. 4433—Aire-Flex Multi-valve Register—4-Way Directional



No. 7033—Aire-Flex Single Valve Register—Adjustable Fins

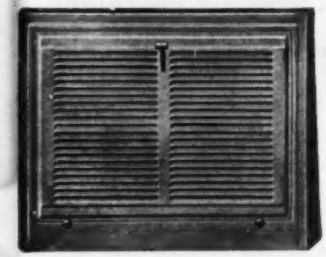


Fig. H-800—Heat-Rite Baseboard Register

Fig. DSC—DuraBilt Grille
Also ideal for floor furnace use

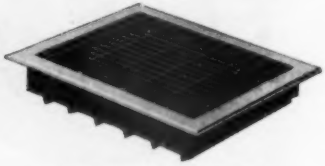


Fig. DR—DuraBilt Floor Register

At our greatly expanded new Cleveland plant we are as well equipped as any plant in the country to supply all your needs — better, more economically. Make AUER Registers your registers. You'll do better with Auer. Ask for complete Auer Register Book, or special Grille Catalog "O" on perforated grilles.

THE AUER REGISTER COMPANY

6600 CLEMENT AVE. CLEVELAND 5, OHIO

CANADIAN DISTRIBUTOR, MARCHAND FURNACE LTD., TILBURY, ONT.

Auer REGISTERS
& GRILLES for AIR CONDITIONING & GRAVITY

WINKLER USERS ARE WINKLER SALESMEN!

"Never spent so little for heating since I put in a Winkler LP*."

"What an oil burner—where'd you buy it?"

WINKLER

*LOW PRESSURE
OIL BURNER

EXCLUSIVE WINKLER FEATURES

CLOG-PROOF NOZZLE
GUARANTEED 10 YEARS

Match this guarantee if you can! The Winkler Nozzle ends fuel waste—permits exact sizing of the burner to the heat requirements of the building.

FUEL METER ASSEMBLY
GUARANTEED 3 YEARS

Another Winkler stand-out. Intimately premixes oil and air—always meters the same amount of oil regardless of viscosity.

The Winkler Sales Training Schools are free to all Winkler dealers. Write for details.

In 1950, the Winkler organization did the biggest business of its career!

The reasons for this are perfectly logical:

First, a completely outstanding product—proved in thousands of installations to do a better job of heating for less money. The Winkler LP* Oil Burner brings to top efficiency the *low pressure* principle of operation.

Second, an alert, aggressive group of dealers who made substantial profits themselves while increasing factory output.

Third, an *unpaid* sales force numbering tens of thousands. These are the *satisfied users* of Winkler Products! A Winkler LP* installation means an enthusiastic booster—and boosters mean sales!

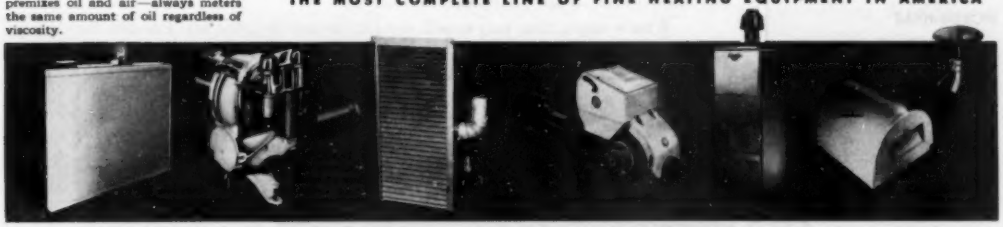
Fourth, a Winkler Merchandising Program which enables dealers to encourage and develop user-salesmanship to the utmost.

Fifth, a strong, nation-wide advertising program which pre-sells Winkler Products to the ultimate user.

Remember, too, that Winkler offers a Free Sales and Engineering Course for dealers in a new school building built especially for the purpose. Hundreds of Winkler dealers have attended—report prompt rise in sales.

Write now for information on how to join-up with this profit-making organization.

THE MOST COMPLETE LINE OF FINE HEATING EQUIPMENT IN AMERICA



Ask about the Winkler Free Sales Training School

WINKLER

Automatic Heating Equipment

U. S. MACHINE CORPORATION
Dept. A-41, Lebanon, Indiana

YOU CAN'T HELP MAKING MONEY

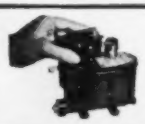
If you sell one of these famous space heaters

ALLEN'S
BARNES
BEYER
COLE HOT BLAST
COLEMAN
COLEMAN *(Canada)*
CREST *(Canada)*
CUSTOM-AIRE
DUO-THERM
ENTERPRISE
ENTERPRISE *(Canada)*
ESTATE-HEATROLA
FINDLAY *(Canada)*
FLORENCE
H. C. LITTLE
HERCO *(Canada)*
INTERNATIONAL
JUNGERS
LACO
LONERGAN
MAGIC CHEF
MONARCH
MONARCH *(Canada)*
MONOGRAM
NESCO
NORGE-HEAT
PERFECTION
PREWAY
QUAKER
SAFEWAY
SIEGLER
SILENT FLAME
SUPERFLAME
TORRIDAIRE
WASHINGTON FRUGAL

PLUS ALL THE LUXURY OF AUTOMATIC HEAT — WITH LOW-COST, EASY TO SELL A-P COMFORT CONTROLS

Yes, if you sell one of the famous-make space or trailer heaters listed here you can offer every customer the luxury of true automatic, thermostatically controlled heat! This means easier selling, because you can offer comfort and convenience equal to the most expensive kind of heating, with no wasted heat — and substantial fuel savings!

What's more, this easy-to-sell comfort means ADDITIONAL PROFITS for you. Write now for Bulletin T-2 on A-P Comfort Controls.



EASY TO INSTALL

There's an A-P Electric or Mechanical Comfort Control actually engineered to fit these heaters. Just mount conversion top on present manual control; connect to thermostat and transformer. Mechanical thermostat even eliminates wiring!

DEPENDABLE Controls

Famous for completely reliable service . . . in oil heating . . . gas heating . . . refrigeration.

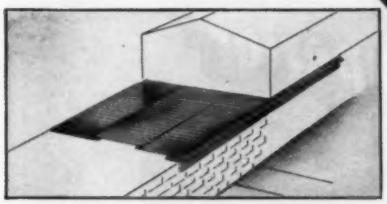
A-P CONTROLS CORPORATION

(formerly Automatic Products Company)

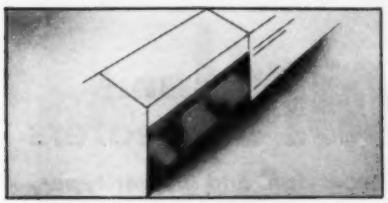
2452 N. Thirty-second Street • Milwaukee 45, Wisconsin • In Canada: A-P Controls Corporation, Ltd., • Cookeville, Ontario

Announcing THE NEW CHASE ONE-PIECE THRU-WALL COPPER FLASHING *and* CAP FLASHING RECEIVER

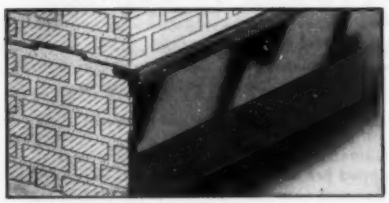
Easily Installed!
Neater!
More Watertight!



DRAINAGE CONTROL. Continuous channels running transversely through the wall permit fast drainage. This feature also provides for expansion and contraction.



MORE EFFICIENT CAP FLASHING. The added rigidity of cold rolled counter flashing eliminates the necessity of locking the cap flashing to the base flashing.



CAP FLASHING RECEIVER. Locks the cap flashing securely and permanently. The Cap Flashing Receiver also provides a guide to position the flashing during installation.

Here is a full weight copper thru-wall flashing (with a 3-way bond!) that combines an integral cap flashing receiver. The design* of this receiver permits the easy installation of cap flashing *after* the base flashing and roof are installed, without plugs or wedges to keep the receiver open. And since the cap flashing is never bent after it is inserted and locked in, it can be formed of *cold rolled* copper. The result: a neater, more watertight installation at reasonable cost.

Investigate the advantages of this outstanding development for flashing building walls. Send for free folder giving details and specifications.

*Patent Pending

Chase BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

Albany†	Cleveland	Kansas City, Mo.	New York	San Francisco
Atlanta	Dallas	Los Angeles	Philadelphia	Seattle
Baltimore	Denver†	Milwaukee	Pittsburgh	Waterbury
Boston	Detroit	Minneapolis	Providence	
Chicago	Houston†	Newark	Rochester†	(†sales office only)
Cincinnati	Indianapolis	New Orleans	St. Louis	

Approved

By AGA and UL — because they meet the highest standards of efficiency and safety.

Specified

By architects, engineers, and builders because they — save space, save time, save construction costs.

Propeller-Fan Type 150 — 60,000 — 90,000 — 120,000 — 150,000 Btu input capacities.

Blower Type 151 — 60,000 — 90,000 —120,000—150,000 Btu input capacities.

Superior

For long-life, efficiency, and economy because they are advanced in design, and quality built.

Low Cost

Competitive for any job because they are sized right, priced right.

MuellerClimatrol unit heaters

Direct gas-fired, propeller fan and blower types, easy to sell . . . easy to install!

There's plenty of unit heater business today — plant expansion beyond present heating capacity . . . military establishments where time and construction short-cuts are prime factors . . . and countless other projects where compact, efficient heating is in demand. With Mueller Climatrol you can go out and get any job.

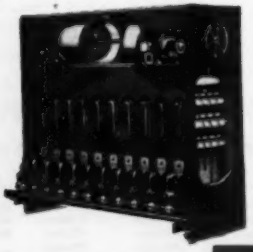
These design features give you a *real* selling advantage:

- ✓ **One piece, all-welded steel** — no joints to leak, separate, or crack.
- ✓ **High Crown sheet** — no "hot spots", no joints or welds exposed to flame or flue gas.
- ✓ **Uniform air flow and heat distribution** — insure maximum heat transfer and fuel economy.

Get behind the Mueller Climatrol unit heater. Sales come easy — installation is simple (units shipped pre-wired and assembled). Write for information . . . *L. J. Mueller Furnace Company, 2030D West Oklahoma Avenue, Milwaukee 15, Wisconsin.*

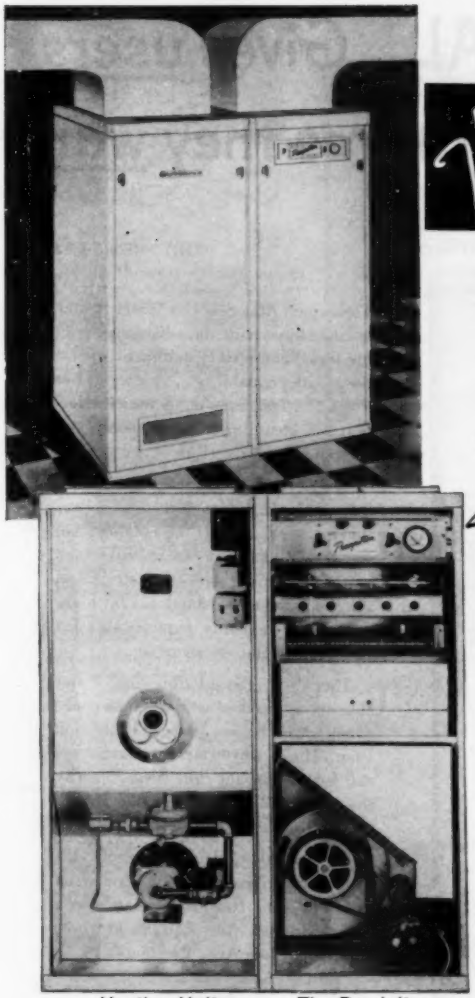
Floor Model Type UH Unit Heater

Direct gas-fired. Ideal for factories, garages, etc. Designed for quick installation, efficient and economical operation. Sectional construction for capacities from 180,000 to 540,000 Btu input. AGA approved.



94th Anniversary — Mueller Climatrol

D-338



Heating Unit The Precipitron

GAS OR FUEL OIL

The Dualtron®

CLEANS as it HEATS

with the WESTINGHOUSE Precipitron

DUALTRON is a new—but thoroughly proved—system of heating, combined in a single, compact, space-saving unit with the famous Westinghouse Precipitron. It cleanses air electronically—removes up to 90% of the damaging dirt before it gets a chance to enter the heating system.

DUALTRON then heats the clean air automatically, with an efficiency that brings new comfort in any degree of winter weather. It's all one operation.

LESS CLEANING — No constant, heavy house cleaning. Draperies, furniture coverings, rugs and walls stay clean and fresh for unbelievably long periods.

MORE COMFORT—No sudden gushes of warm air, alternating with cold drafts. Heat flows evenly, gently. Humidity is maintained at correct levels — you breathe clean, moist air.

Architects and Contractors ARE WELCOME TO OUR ENGINEERING SERVICE

The DUALTRON Company
322 Perry Highway Pittsburgh 29, Pa.
Phone WEllington 1-2021

Bryant BLUE SEAL...Gives users the water heater features they want

The Bryant *Blue Seal* Gas Water Heater is made to provide the advantages people *want:* completely automatic operation . . . dependability . . . *plenty* of hot water . . . fast, easy temperature selection . . . cleanliness and economy . . . cathodic tank protection.

And beyond these purely operational features is *built-in* quality that makes for greater customer acceptance and satisfaction. From the extra-heavy tank to the gleaming, easy-to-clean jacket, the *Blue Seal* meets standards far higher than any existing requirements for gas water heater construction.

That's why Bryant *Blue Seal* Water Heaters are backed with greatest confidence by the Bryant 10-Year Protection Plan. That's why water heater buyers *ask* for the Bryant *Blue Seal* . . . why the plumber-dealer who handles Bryant makes *profitable* sales-installations.

For complete details, contact the Bryant Distributor near you or write direct. Bryant Heater Division, Dept. 173, Affiliated Gas Equipment, Inc., 17825 St. Clair Ave., Cleveland 10, O.

Let the pup be furnace man ...and water boy too!

bryant

AUTOMATIC HEATING

Bryant Model 115 *Blue Seal* Automatic Gas Water Heater. Made in 20, 30, 40 and 50-gallon capacities. Features Grayson *Unitrol* with 100% Safety Pilot; extra-thick *Fiberglas* insulation; exclusive *Link-Trap* segmental baffle; exclusive streamlined downdraft diverter; sturdy one-piece steel base; exclusive porcelain-enameled aeration plate; cast iron burner with raised, drilled ports; and the *Protect-O-Rod*, magnesium alloy anode which inhibits rust, adds *years* to life of tank.

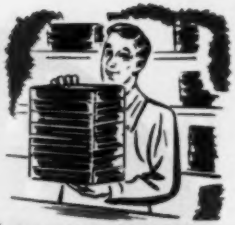
Your *single* source of supply for everything in gas heating equipment!

1. AAF ENGINEERED!

Designed by the acknowledged leaders in air filtration, AMER-*glas* Filters are better filters — extra-resilient body for longer service . . . continuous, interlaced white glass filament . . . thermoplastic bond. Patented viscosine coating increases dirt-catching efficiency.

2. HOSPITAL-WHITE!

AMER-*glas* filters are "hospital-white" . . . look clean . . . outsell other leading brands on eye-appeal alone. See for yourself! Slip an AMER-*glas* filter in the colorful 3 dimensional display . . . then get set for extra sales, extra profits!



3. SMOOTH TO TOUCH!

AMER-*glas* filters are easy (and more *pleasant)* to handle. No prickly slivers, no unpleasant odor, no "greasy feel". You and your customers too, will appreciate this clean-looking, clean-feeling filter.

4. SELLING AIDS!

AMER-*glas* filters offer you complete selling aids — envelope stuffers, counter displays, window streamers, newspaper ads, radio spots. All material is customer-tested, sells "health", "fuel savings" and "easier housecleaning".

5. BIG-VOLUME MARKET!

There is an enormous and growing market for AMER-*glas* filters right in your own back yard. More than half of all warm air furnaces now being installed are forced-air units (in some areas, nine out of ten).

5 reasons why

AMER-*glas*

REPLACEABLE AIR FILTERS

mean more money in *Your Pocket!*

the AMER-*glas* distribution policy

AMER-glas filters are sold only through leading distributors, each servicing his dealers in the usual manner. For the further convenience of dealers and distributors, there are American Air Filter Company Representatives in 65 principal cities (listed under "Air Filters" in your classified telephone directory).

AAF

An *Engineered* product of

American Air Filter

COMPANY, INC.

MAIL TODAY!

AMERICAN AIR FILTER CO., INC.
353 Central Ave., Louisville 8, Ky.

Please send me complete information on AMER-glas Replaceable Air Filters. Show me proof of the profits!

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

PENN

TO GIVE YOU SUPPORT with strong national consumer advertising

Through the years, PENN has given you heating controls which are *second to none.* In fact, it has pioneered and *led* the control field since 1934 with HEAT ANTICIPATION . . . a principle of thermostat operation which holds temperature within one degree . . . *stops* HOT-n-COLD LIVING!

Now . . . PENN is giving you more than an outstanding product. It is giving you the support of a powerful *spring and fall* consumer advertising program which will *tell your prospects how to avoid* HOT-n-COLD LIVING! And we're asking them to see their heating dealer . . . *that means you.* Remember . . . for greater customer satisfaction, greater good-will, greater profits . . . recommend and install PENN heating controls. **Penn Electric Switch Co., Goshen, Indiana.** Export Division: 13 E. 40th Street, New York 16, N. Y., U. S. A. In Canada: Penn Controls Limited, Toronto, Ontario.

BETTER HOMES & GARDENS
AMERICAN HOME
NEWSWEEK

fed up with HOT-n-COLD LIVING?
enjoy 1° temperature control with
PENN
heat anticipation
Comfort with a capital "C"! That's what you'll enjoy when your heating system is controlled by the amazingly sensitive PENN *heat-anticipating* thermostat.
It "feels" approaching temperature changes *before you do* and starts the burner before the room has a chance to become uncomfortable. Result? Room temperatures are held within 1° regardless of outside weather conditions . . . *that's real, healthful comfort!*
This accurate control stops fuel waste caused by HOT-n-COLD heating. For even greater fuel economy of automatic day-night control, also get PENN Tem-Clock. If you want automatic heating at its best, ask your dealer for PENN *heat anticipation* . . . it costs no more!
Penn Electric Switch Co., Goshen, Indiana
ENGINEERED COMFORT
PENN
AUTOMATIC CONTROLS
Selected by leading manufacturers for over 20 years
FOR HEATING, REFRIGERATION, AIR CONDITIONING PUMPS, AIR COMPRESSORS, ENGINES, GAS RANGES

PENN

AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, PUMPS, AIR COMPRESSORS, ENGINES, GAS RANGES

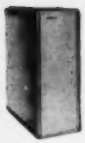
SIMPLIFY YOUR Buying!

SIMPLIFY YOUR Selling!

WITH

Luxaire

YOU SAVE TIME...YOU MAKE MORE PROFIT...



Series A Gas-Fired Steel Air Conditioning Unit.

Series H Gas-Fired, Steel Utility Air Conditioning Unit.

Series G Gas-Fired Gravity Furnace Available with Steel or Cast Iron Heating Element.

Series CA Gas-Fired Air Conditioning Unit. Cast Iron heating element.

No. HC-95-E Gas Counter-flow Unit, for Slab Floor, Perimeter Heating.

No. VHC-75-E Oil Counter-flow Unit, for Slab Floor, Perimeter Heating.

Series O Gun, Oil-Fired Air Conditioning Unit. Steel heating element.

Series AC-F Coal-Fired Air Conditioning Unit. Steel Heating Element.

Series No. 600 Coal-Fired Gravity Furnace. Steel heating element.

Series C Coal-Fired, Cast Iron Furnace.

You Can Supply a Unit for Practically Any Heating Requirement. You Can Supply Units With STEEL or CAST IRON Heating Elements

When you make Luxaire your leader, you get two profit-making advantages

1. **You simplify your buying.**
2. **You simplify your selling.**

With Luxaire you avoid costly "shopping-around" as your Luxaire wholesaler has a complete and adequate stock to supply your requirements.

With Luxaire you can fill any order for practically any type or size or kind of heating unit. You establish and keep happy relationship with the architect — builder — homeowner.

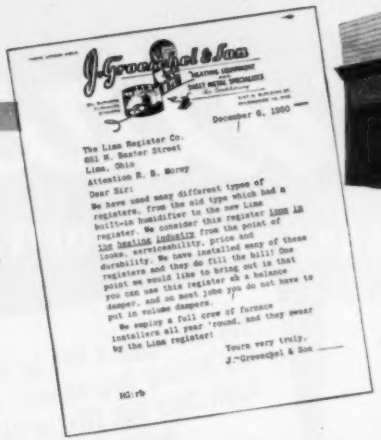
The thousands of dealers who sell Luxaire advantages know that Luxaire means greater profits, faster turnover and satisfied customers. Ask your jobber for catalogs and prices on Luxaire.

THE Luxaire C. A. OLSEN MANUFACTURING COMPANY • • ELYRIA, OHIO

HEATING & AIR CONDITIONING UNITS

"Tops in the heating industry"

SAYS MILWAUKEE DEALER ABOUT *Lima* Registers



December 6, 1950

The Lima Register Co.
651 N. Baxter Street
Lima, Ohio
Attention R. E. Morey

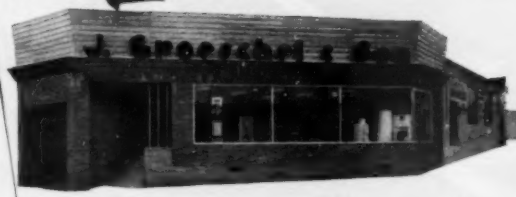
Dear Sir:

We have used many different types of registers, from the old type which had a built-in humidifier to the new Lima register. We consider this register from the point of the heating industry, price and looks, serviceability, price and durability. We have installed many of these registers and they do fill the bill! One point we would like to bring out is that you can use this register as a balance damper, and on most jobs you do not have to put in volume dampers.

We employ a full crew of furnace installers all year 'round, and they swear by the Lima register!

Yours very truly,
J.-Groeschel & Son

HG:rb



This progressive dealer began in the heating business in 1896. New showroom and warehouse shown here were added recently, when business expanded. J. Groeschel & Son purchase their Lima registers from the Auer Steel & Furnace Co. in Milwaukee.

DEALER AFTER DEALER TELLS US a similar story! They say that they like the Lima line of wall registers, floor registers and floor diffusers because:

1. **FASTER TURNOVER** results from tremendous consumer demand and brand-preference for Lima registers.
2. **MINIMUM INVENTORY INVESTMENT** assures maximum return for investment dollars.
3. **INDIVIDUAL PACKAGING** prevents damage, helps keep stockrooms neat and orderly.
4. **ACCURATE INVENTORY CONTROL** is possible because size, finish and style of Lima units are printed on cartons.

• • •

WRITE TODAY for full details and specifications on the Lima line, or ask your local jobber to stock Lima registers.

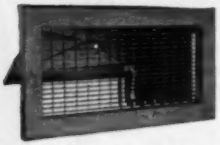
Read these comments from jobbers!

"We started stocking Lima registers in 1950 and sold a good number to new accounts who had not used the Lima line before. In every instance, our dealers have been very pleased with the registers both from an operational standpoint as well as appearance. Homeowners' acceptance of the Lima line has been very gratifying. They show a definite preference for Lima over any other available line."

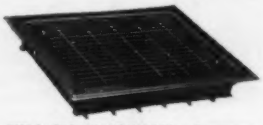
H. F. Wallace
Vice-President, the THERMAL COMPANY, Inc.

"This past summer we started merchandising Lima registers and immediately met with wonderful acceptance among the heating trade. The possibilities of a self-balancing register made in one piece, as yours is, have met with favor among all the heating dealers we serve."

Chas. H. Foss
DEALERS SUPPLY OF RAPID CITY



LIMA WALL REGISTER—Most beautiful, efficient, durable wall register ever made! Allows one man to balance a heating system—so simple the homeowner can make individual adjustments himself. Eliminates need for quadrant dampers! Attractive . . . harmonizing Lima metallic bronze finish.



LIMA FLOOR REGISTER—Strongest, most beautiful floor register ever made. So strong you can drive a truck over it. Resistance-welded into one piece of steel. Easy to operate and keep clean! Grid spaced to avoid catching high heels or furniture legs. Finished in Lima Duragold; special finishes can be arranged.

NEW!

LIMA FLOOR DIFFUSER 2" x 14"—Designed especially for perfect perimeter heating. Sends flat, wide spray of warm air over cold spots—near windows and doors—and *kills drafts*. Regardless of volume, the diffusion pattern stays constant! No sooty streaks on walls or draperies! In standard metallic Lima bronze or Duragold.

THE *Lima* REGISTER COMPANY • 651 N. BAXTER STREET, LIMA, OHIO

Shirtsleeve Comfort

can be your best salesman!

Shirtsleeve Comfort! There's an idea for you. A powerful, hard-hitting *selling* idea that's sure to mean business and profits for you!

It's what your prospects *want*. It's what *you* can offer—with Ingersoll Heating Equipment.

Here's the line that's setting the pace in *Shirtsleeve Comfort* and furnace value. A complete line of warm air equipment—winter air conditioners, gravity furnaces, conversion burners, highboys, lowboys. Models and sizes for practically any warm air heating need. Outstanding design and creative engineering—for maximum performance. Top quality materials and construction—for a long life of trouble-free comfort. Quality features home owners want. All backed by Ingersoll's many years of heating experience, engineering leadership and precision manufacturing.

And for *you*—appeal-packed literature, ad mats, co-op ad plan, decals, display materials and other sales promotion aids, factory engineering assistance, distributor help.

Want to let *Shirtsleeve Comfort* sell for you? Hustle that coupon back to us and we'll send you all the competition-beating details.

Ingersoll
HEATING EQUIPMENT
for Shirtsleeve Comfort

©IPD

INGERSOLL PRODUCTS DIVISION
Borg-Warner Corporation
Kalamazoo, Michigan

DISTRIBUTORS-DEALERS!
Mail coupon for details!

INGERSOLL PRODUCTS DIV., Borg-Warner Corp.
Dept. AA-2 Kalamazoo, Michigan
We're interested! Rush literature and details for:
☐ Franchise Distributorship ☐ Dealer
Send us literature, too!
☐ Architect ☐ Contractor
NAME_____
COMPANY_____
ADDRESS_____
CITY_____ STATE_____

U·S·S GALVANIZED STEEL SHEETS—combined with quality workmanship—make this ductwork a clean, neat, long-lasting job. The heavy coating of zinc offers protection against almost every form of corrosion.

HERE'S ANOTHER VIEW of the same job, taken outside the residence. Inside or outside, U·S·S Galvanized Sheet Sheets help assure your customers lasting satisfaction.

for a quality job all the way through U·S·S GALVANIZED STEEL SHEETS

● There's no substitute for a combination of quality materials and quality workmanship. That's why you can turn out your finest jobs with U·S·S Galvanized Steel Sheets.

In the shop, you'll find that U·S·S Galvanized Steel Sheets make fabrication faster . . . material savings greater. These top-quality sheets are easy to handle . . . they can be bent, rolled, cut and stamped with excellent results.

On the job, U·S·S Galvanized Steel Sheets present a clean, neat appearance that is matched only by their long life and superior resistance to corrosion. A heavy, uniform, tightly-adhering coating of zinc gives complete protection against almost every corrosive condition.

You can do a better, longer-lasting job inside and outside with U·S·S Galvanized Steel Sheets.

COLUMBIA STEEL COMPANY, SAN FRANCISCO • TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM • UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS **GALVANIZED STEEL SHEETS**

1-371

UNITED STATES STEEL

EXTRA NIAGARA NEWS EXTRA

NIAGARA ADJUSTABLE BAR FOLDER

FEATURES SPIRAL SPRING COUNTERBALANCE

Available in 21, 30, 36 and 42" working lengths. Capacity 20 gage mild steel. Small 21" length not furnished with counterbalance.

COMPACT DESIGN FOR SHOP AND ON-THE-JOB USE

Simple and efficient self-contained spiral spring counterbalance, designed to minimize operator fatigue, does not use any additional bench space.

Clamping and folding in one motion of the operating handle affords accuracy and high production.

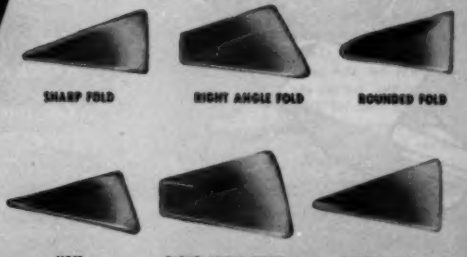
Adjustable for narrow or wide folds and desired angle of bend.

Adjustable for sharp bends or rounded bends as required for wiring.

Designed for right or left-handed operators.

Write for Bulletin 74-A

SPEEDS UP AND CUTS COSTS OF FOLDING AND HEMMING



NIAGARA MACHINE & TOOL WORKS · BUFFALO 11, N. Y.

Manufacturers of America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

DISTRICT OFFICES: DETROIT · CLEVELAND · NEW YORK

How many of MOR-SUN's 500,000 PROSPECTS are YOURS?

"Sunny" **MOR-SUN** introduces a 1951 Replacement Sales Campaign . . .

a complete nationwide promotional program!

MOR-SUN presents another first in the home heating industry . . . *the 500,000 PROSPECT plan!*

Now, from coast to coast, every MOR-SUN representative is presenting this powerful plan to all MOR-SUN Merchandisers . . .

Yes, this sensational New 1951 Replacement Sales Campaign is geared to *turning 500,000 live prospects into purchasers!*

How many of them will be yours?

MOR-SUN *FURNACE DIVISION*
MORRISON STEEL PRODUCTS, INC.
625 AMHERST ST. • BUFFALO 7, N. Y.

Get on this nationwide profitable handwagon . . . Phone or wire us for details.

"Sells on MOR-SUN PRESSED STEEL FURNACES *Sight"*

"Springfield, Ill. Jobbers and Dealers Find . . . .

Viking *WINDOW FANS*

AND THE UNIQUE VIKING SALES PLAN* *Mean Easier, Larger Profits."*

says LOWELL McCORD, Friendly Viking Representative

"Dealers here say VIKING WINDOW FANS Are Their *Best* Source of Summer Profits"

D. R. HUNTLEY, Material Supply Co., 1717 E. Washington, Springfield, Illinois

"Springfield dealers tell me that Viking's special features mean an easier selling job. And Viking's unique sales plan and co-op advertising system bring more sales and larger profits. Once a dealer finds that he can break all sales records and get a longer profit with Viking Window Fans, he's sold on them permanently!"

Read Why These Alert Dealers Choose VIKING Fans Over All Others:

"Almost every customer I sell brings in friends and relatives who want the night - air - cooling benefits of the BIG Viking Fan. That 22-inch blade really moves air in a hurry."

DICK CORRELL, Central Heating Co., 130 East Jefferson, Springfield, Illinois

"I sell in the customer's home so he can feel for himself the effects of temperature dropping 20° to 25° when the whole house is flooded with 3100 cubic feet per minute of cool outside air . . . that clinches the sale, but quick."

E. A. H. SCHMIDT, Schmidt Bros., Inc., 1210 E. Laurel, Springfield, Ill.

"That Viking fan really beats competition. It's the lowest priced quality fan I know of, and just the right size for cooling the homes and apartments in my neighborhood."

ANDREW YUSKANICH, L. & L. Sales, Inc., 2428 So. MacArthur Blvd., Springfield, Ill.

Fan Promotion Kit contains all the sales tools needed to pile up record profits from fan sales: FREE consumer leaflets, newspaper ad mats, illustrated publicity release, radio spot announcements, home demonstration plan, complete sales instructions.

Unique Viking Yadnit increases net profits; redeemable for $3 towards liberal local co-op advertising. You get one Viking ADvertising uNIT for each fan you buy.

Viking Window Fan Display shows customers how Viking home cooling works; a demonstrator that really SELLS FANS. Hundreds of displays sold for $8.00, but you can get ONE DISPLAY FREE for only 3 Yadnits. Write for complete Viking deal and name of nearest jobber.

Viking

AIR CONDITIONING CORP.

5601 Walworth, Cleveland 2, O.

Mr. M. Hochede, General Manager
New Mission Heating & Ventilating Co.
San Francisco, Calif.

"SUBSTANTIAL SAVINGS"

with

QC METALBESTOS

GAS VENT

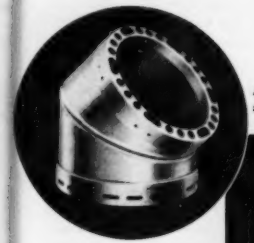
reported by San Francisco contractor.

Mr. M. Hochede, General Manager of the New Mission Heating & Ventilating Company, having recently completed work on a large housing project, has this to say about Metalbestos Gas Vent Pipe:

"When QC Metalbestos was first manufactured by the William Wallace Company, we could see that there would be a substantial saving in labor increasing our profits and enabling us to do more work with the same amount of men. As one of the most vital things in any business is labor, we were quick to adopt this new product."

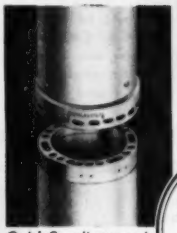
LOWER INSTALLATION COSTS were possible because lightweight self-aligning sections go quickly into place. No special tools or skills needed. Adjustable lengths and versatile fittings eliminate costly cutting and special fabrication . . . keep labor costs to a minimum.

Order from your jobber or write to Dept. B.



Adjustable Elbows simplify installation.

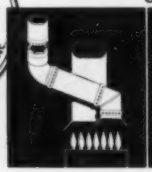
Adjustable Length eliminates cutting and fitting.



Quick Coupling speeds assembly.

LISTED UNDER RE-EXAMINATION SERVICE UL OF UNDERWRITERS' LABORATORIES, INC.

Metalbestos Gas Vent pipe meets all safety requirements of the Underwriter's Laboratories for Type B Gas Vents.



METALBESTOS DIVISION

WILLIAM WALLACE COMPANY · BELMONT, CALIF.

NOW IS THE TIME

To Profit by Selling..

..Fuel Saving AND Comfort WITH SKUTTLE HUMIDIFIERS

People generally are hot to buy anything with which they can save fuel without shivering.

Skuttle Humidifiers are made to order for this market. Their fuel saving feature makes them go like hot cakes with a little sales effort.

With Skuttle Humidification, thermostat control of a warm air furnace can be 3 to 4 degrees lower and the house may be even more comfortable. Oil companies say every degree lowered, saves 3% of the fuel.

The warm moistened air is far more healthful. Desert dry air *without humidification* decreases resistance to colds, coughs, bronchitis, "flu," pneumonia and sinus troubles.

Skuttle Series 600 Humidifiers—Self Flushing—Self-Cleaning—This feature is a sales clincher—raise a lever and the Skuttle Series 600 flushes itself, cleaning out lime, muck and dust.

Vapoglas**® Evaporator Plates—Pure glass fiber—faster capillary action than any other plate or wick. They assure maximum evaporation.

Skuttle Humidifiers are easy and profitable to sell. And you can sell replacement plates every year at additional profit. Write for details.

Skuttle

MANUFACTURING COMPANY
4099 BEAUFAIT • DETROIT 7, MICH.

LAU offers you the ALL NEW, refined and improved

Small, compact, efficient and quiet

A 7½" Double Inlet Blower with motor built INTO the Unit!

The ALL NEW LAU A7-DD pictured here is the perfect unit for in-a-wall gas and oil furnaces. It is the one answer to manufacturers who build hi-boy, low-capacity units. It is the ONLY unit completely UL approved, covering the entire unit (also approvable in combination with furnace).

The A7-DD has fingertip adjustment for wide range 7-speed control. For furnaces to be rated at capacities from 44,000 to 76,000 b.t.u. per hour (bonnet) at 100° temperature rise—or capacities from 31,000 to 54,000 b.t.u. per hour (bonnet) at 70° temperature rise.

MEMBER INDOOR COMFORT

Lau Series "A" blower assemblies

The all-time outstanding achievement in the blower field. Overall size is considerably smaller than formerly and many features are revolutionary —exclusive with Lau—and protected. Entire unit is die-formed, lending itself to mass production on precision-built equipment with reflected low costs. Has 1-pc. motor mounting, self-aligning bearing, new LAUsteel pulley wheel. Write for Catalog 602 giving complete dimensions and performance data.

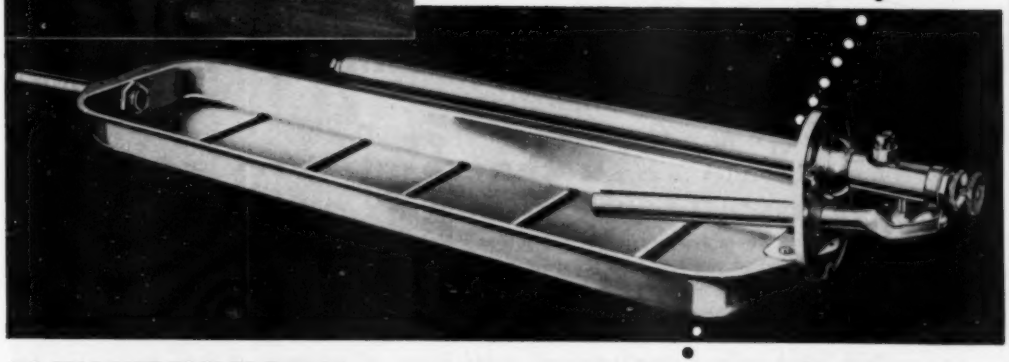
THE LAU BLOWER COMPANY • DAYTON 7, OHIO
2011 Home Ave.

World's Largest Manufacturer of Furnace Blowers

Instant Steam

FROM A SIZZLING HOT PAN ...THE MOST EFFICIENT, MOST DEPENDABLE WAY TO PUT

MOISTURE IN THE AIR . . . .



NO STAGNANT POOL TO REHEAT

Only a *thin film of water forms in pan.* Pan heats extremely fast. Water vapor is formed quickly—efficiently.

SUPER-SENSITIVE THERMOSTAT

Fool-proof. Gives *immediate response to temperature change.* Starts and stops flow of water according to bonnet temperature. Leaves only thin film of water in bottom of pan, when furnace heat goes down.

OUTSIDE SCREW ADJUSTER

Easily reached. Permits *fingertip control of water flow.* Lock nut assures hairline regulation.

EASY INSTALLATION

Pan rests directly on combustion dome for most efficient operation. Can be suspended in plenum chamber, if necessary.

ONE KIT TO PURCHASE

All accessories contained in one compact unit. Easily assembled—economical to use—quick to sell. With 12 pan sizes for any type warm air furnace.

THERMO-DRIP *Automatic* HUMIDIFIERS

With the AUTOMATIC HUMIDIFIER water drips into pan only after pan is hot. Each drop sizzles into steam as it strikes heated pan surface.

This puts the MOST MOISTURE into air stream when it is MOST NEEDED. That's why Thermo-Drip gives *faster — more efficient vaporization.* Write TODAY for FREE literature. Dept. A-41

AUTOMATIC HUMIDIFIER CO. Cedar Falls, Iowa

ARMSTRONG'S *complete* furnace line gives you a chance at every prospect

There's no reason for evasion or substitution—which so often results in the loss of a sale—when you talk to a prospect with the Armstrong line at your command. What he wants you've got! But how *can* you, without a back-breaking inventory? Armstrong has the answer for that, too. You carry just a few furnaces—the fast-movers. You sell others with the brand-new Armstrong Presentation Book, which carries a straight-forward, simple, logical sales story on all fuels, all models. You can do it without worrying about cross-country shipment of the furnace you sell; your nearby jobber's inventory is *yours*, without the investment. The inventory's at your back door, but the money's in your pocket. Certainly, if you want a full line—*all* the advantages of a full line—you want Armstrong. Drop us a line today. *Now is the time for action!*

Armstrong's two huge plants serve both sides of the continent quickly, economically. A warehousing distributor, with a complete Armstrong inventory, is within a stone's throw of everywhere. Wherever you are, Armstrong's distribution system is set up to serve you. It's better, quicker, more profitable . . . for you.

ARMSTRONG
FURNACE COMPANY

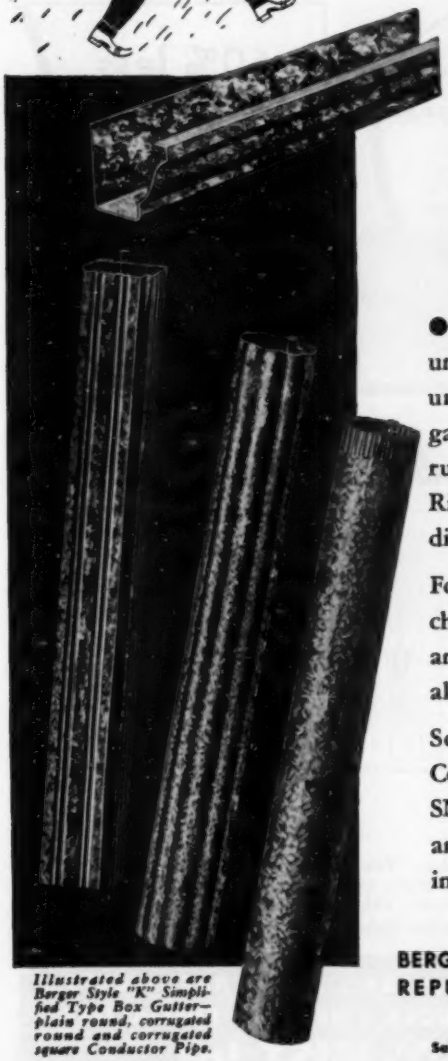
COLUMBUS, OHIO — DES MOINES, IOWA

Please address Dept. AA at our plant nearest you

Warm-Air Furnaces—Gas, Oil, Coal—A Complete Line

In rain or snow... or 20 below

BERGER
CONDUCTOR PIPE AND GUTTERS



Illustrated above are Berger Style "K" Simplified Type Box Gutter—plain round, corrugated round and corrugated square Conductor Pipe.

ASSURE LONG LIFE AND TROUBLE-FREE SERVICE

● Berger drainage products have proved unexcelled for long life and trouble-free service under all weathering conditions. Made from galvanized steel—and from copper—they resist rust and the abuses of fabrication and wear. Rigid seams of Berger Conductor Pipe prevent distortion when installed.

Formed in one operation in long length on machines that never vary, Berger Conductor Pipe and the simplified practice Type "K" Gutter are always *uniform*—make installation easy and rapid.

See your local distributor about Berger Conductor Pipe, Accessories and Gutters—also SNAPTITE Eaves Trough, Roofing of all types and Metal Lath. Berger is playing no favorites in distributing its products.

BERGER MANUFACTURING DIVISION
REPUBLIC STEEL CORPORATION
CANTON 5, OHIO

Sales Offices in Boston, Detroit, Indianapolis, Philadelphia and St. Louis

REPUBLIC STEEL

SOMETHING TO REMEMBER WHEN SELECTING A HUMIDIFIER FOR MODERN WARM AIR HEATING SYSTEMS . . . . . .

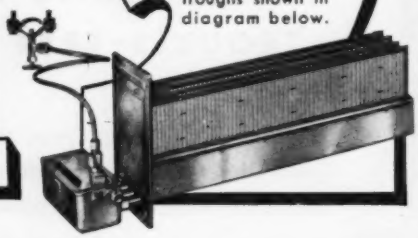
ONLY MAID-O'-MIST CONVECTOR HUMIDIFIERS OFFER THESE *3 BIG ADVANTAGES*

50% less INSTALLATION TIME!

Just cut out opening in plenum, attach plenum flange frame, slip in factory assembled unit and make water connections —that's all.

30% more EVAPORATING AREA!

Due to unique design of water troughs shown in diagram below.



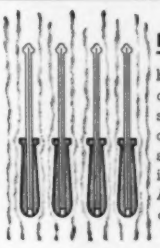
60% less AIR RESTRICTION IN THE PLENUM!

Permits use in small plenums of modern warm air furnaces.

Pre-assembled unit cuts installation time in half!

To make it easier for you, Maid-O'-Mist assembled all the parts of these convector humidifiers here at the factory. The only thing you have to do is cut the proper size opening in the plenum, attach the plenum flange frame, and make the necessary connections. No tedious fitting or fastening to the back of the plenum. The unit is entirely supported by the flange frame in front.

And remember, Maid-O'-Mist convector humidifiers can be fitted to either vertical or sloping bonnet furnaces. There's a type for every installation, permitting adjustment of up to 30° pitch for sloping bonnet furnaces.



Free flow of heated air

between evaporation pads and all sides of humidifier is shown in diagram. This exclusive design reduces air restriction 60%. Also puts every inch of the humidifier to work. Actually provides 30% greater evaporating area.

Available in 13 different sizes!

Maid-O'-Mist Convector Humidifiers have evaporation capacities of 1 to 10 gallons of water per day, depending on size. Made entirely of non-ferrous metal and equipped with automatic (float-operated) supply valve. You can recommend Maid-O'-Mist to your customers with assurance . . . you can install Maid-O'-Mist with ease, speed and profit. Get full information from your jobber, or write for Bulletin 701-B.

MAID-O'-MIST Inc.
HEATING SPECIALTIES

AUTOMATIC HUMIDIFIERS . . . . . AUTO-VENTS
WATER LINE CONTROLS . HEATING SPECIALTIES

MAID-O'-MIST, Inc.

3217 NORTH PULASKI ROAD . CHICAGO 41, ILL.

Are YOU losing money by replacing "good" controls?

One of the most common questions asked by heating contractors is "How can I cut down on the number of call-backs on service calls?"

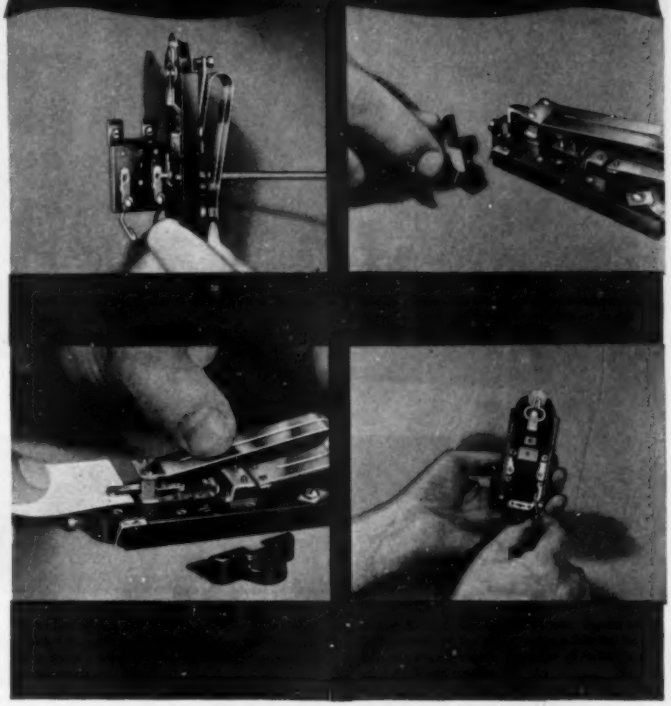
Higher labor costs, loss of servicemen to the armed forces and the impending shortage of new controls makes the elimination of unnecessary call-backs essential!

A Service Department study of the causes for return of controls for repair shows that about one-third of all controls returned needed nothing but cleaning . . . and over one-half of all controls sent in were operative! This would seem to indicate that routine inspections such as checking condition of thermostat contacts is important even if other service work was necessary.

Systematic service checking will help to place the source for failure and breakdown where it belongs. Removal of "good" controls can be cut to a minimum and a real service will be done by the heating contractor for himself and for his customer.

Perfex will assist you with helpful service information and factory experience. Have your men attend the next Perfex School in your area. Or call in your nearby distributor and have him put on a training program for your men. Then, see that your servicemen are equipped with the Perfex booklet, "Selection, Installation and Service."

How to clean contacts on *Magic Dial* thermostats

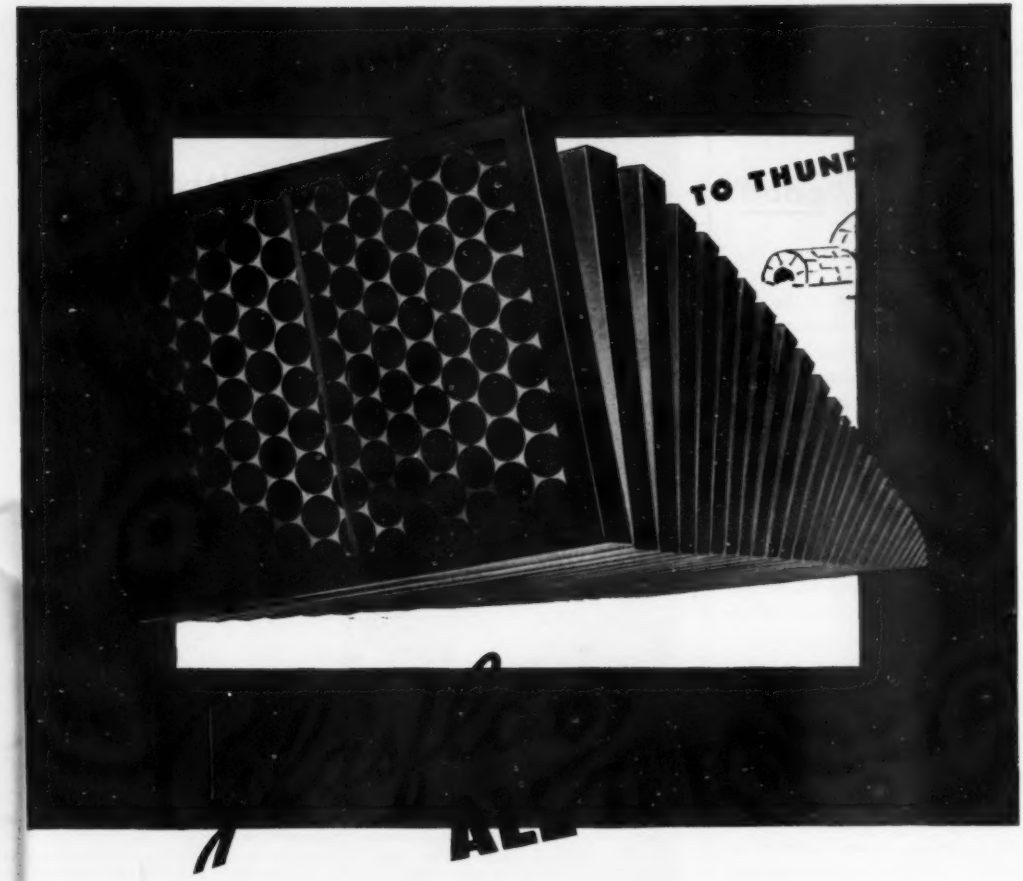


• Since most of the Perfex Controls returned for replacment are operative, but could stand cleaning or minor adjustments, a series of advertisements is being prepared to show you how to handle minor servicing in the home, thus reducing your service costs and call-backs. Clip the ads in this series—keep them available for reference —watch your service costs decrease!

PERFEX

CONTROLS YOU CAN TRUST

PERFEX CORPORATION, MILWAUKEE, WIS. In Canada, Perfex Controls Ltd., Guelph, Toronto 1



There are three good reasons why Glasfloss air filters have met with such phenomenal success.

1. Glasfloss air filters handle easier, sell faster, at higher profits.
2. Glasfloss air filters bring repeat orders from satisfied customers.
3. Glasfloss air filters are the most improved glass fibre air filters on the market.

Its all because the long fine glass fibres really STOP DUST while allowing greater air circulation. Glass fibres as fine as human hair are easy on the hands, yet tough on dust. Glasfloss air filters are made for all types of central heating, ventilating and air conditioning systems. There's a big profit in this market with Glasfloss. Write today for complete information. Address Dept. AA-4.

YOUR BEST BET *Glasfloss Air Filter* **TO TRY YET!**

Glasfloss 155 EAST 44th STREET, NEW YORK 17, N. Y.

Finest Buy in the Land . . . on *Every* Count!

NEW 1951 CHEVROLET

Advance-Design TRUCKS

These new 1951 Chevrolet trucks are tops in value. They're tough and rugged. They're loaded to the brim with power. They're thrifty . . . move massive loads . . . handle like no other truck. Chevrolet's latest haulers have 51's finest new features, too. Features like new, super-effective brakes that are extra-safe and easy to operate. Features like Chevrolet's Dual-Shoe parking brake, Chevrolet's new Ventipanes and new cab seats that bring you comfort with a capital "C." Visit your Chevrolet dealer and look over these great new trucks. You'll find the right truck for *your* job!

CHEVROLET MOTOR DIVISION, *General Motors Corporation*
DETROIT 2, MICHIGAN

CHEVROLET

ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the 105-h.p. Loadmaster or the 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • **POWER-JET CARBURETOR** — for smooth, quick acceleration response • **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement • **SYNCHRO-MESH TRANSMISSIONS**—for fast, smooth shifting • **HYPOID REAR AXLES**—for dependability and long life • **NEW TORQUE-ACTION BRAKES**—for light-duty models • **PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES**—for medium-duty models • **NEW TWIN-ACTION REAR BRAKES**—for heavy-duty models • **NEW DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models • **NEW CAB SEATS**—for complete riding comfort • **NEW VENTIPANES**—for improved cab ventilation • **WIDE-BASE WHEELS**—for increased tire mileage • **BALL-TYPE STEERING**—for easier handling • **UNIT-DESIGN BODIES**—for greater load protection • **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

NEW NiAGARA

SERIES 40-G Gas-Fired STEEL GRAVITY FURNACES

Factory Assembled

delivered in a single carton ready for speedy installation

Available NOW in three sizes—input AGA 60,000, 80,000 and 105,000 BTU—these new, compact units are ideally suited to modern needs for automatic gravity furnaces.

Write for catalog sheet giving specifications.

NIAGARA FURNACE DIVISION • **The Forest City Foundries Company**
2500 West 27th Street • **Cleveland 13, Ohio**

NiAGARA **makes all 3: Gas • Oil • Coal Furnaces • Cast Iron or Steel**

A COMPLETE *New* LINE

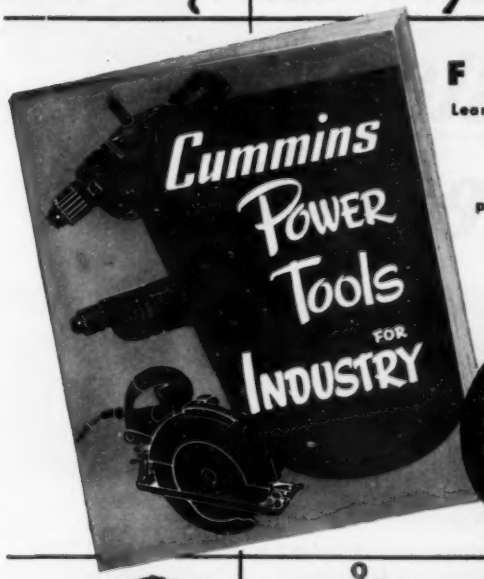
BACKED BY MORE THAN 60 YEARS OF PRECISION MANUFACTURING

MODEL 427
¼" HEAVY DUTY DRILL

MODEL 430
⅜" STANDARD DUTY DRILL

MODEL 435
⅜" STANDARD DUTY DRILL

MODEL 230
⅜" HEAVY DUTY DRILL



FREE . . . !

Learn what's new and different in Power Tools . . . see the newest in styling and engineering, in power and performance. These tools do every drilling, sawing, cleaning and grinding job 10 times faster . . . 100 times easier!

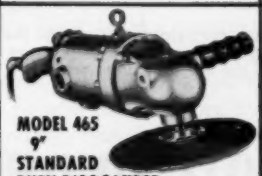
New! 36 PAGE CATALOG

MODEL 225
½" SUPER-SPECIAL DRILL

MODEL 700
BUILDERS SPECIAL POWER SAW

MODEL 471—6" GRINDER
LONG END BELL

MODEL 460
7"
HEAVY DUTY
DISC SANDER



MODEL 465
9"
STANDARD
DUTY DISC SANDER

MODEL 478—8" GRINDER
LONG END BELL

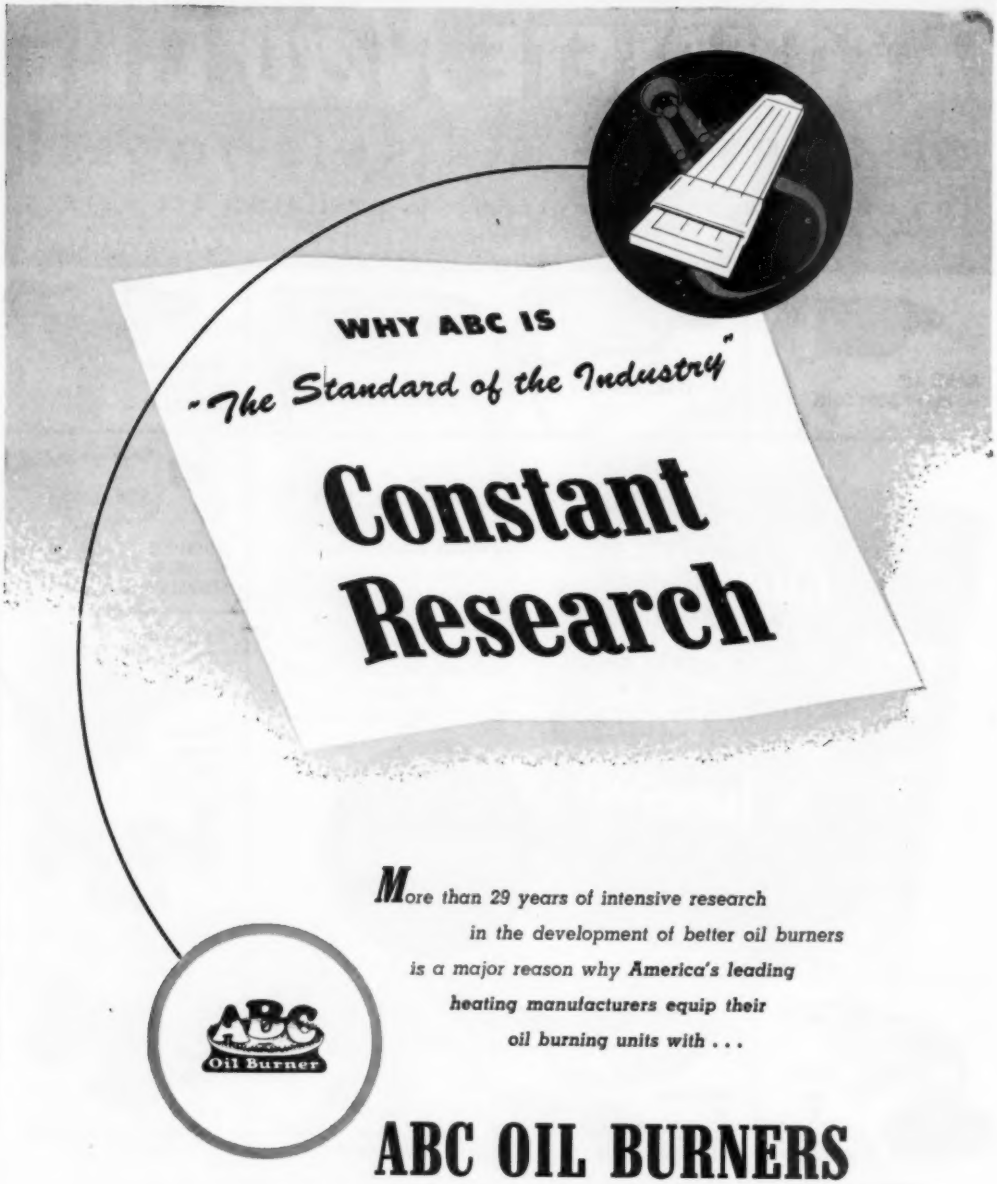
MODEL 475—6" GRINDER
LONG END BELL

SINCE 1887

Cummins PORTABLE TOOLS

DIVISION OF CUMMINS - CHICAGO CORPORATION
4740 NORTH RAVENSWOOD AVENUE • CHICAGO 40, ILLINOIS
IN CANADA: CUMMINS PORTABLE TOOLS, 33 Church Street, Toronto, Ontario

ASK YOUR JOBBER . . . ASK YOUR JOBBER . . . ASK YOUR JOBBER . . . ASK


WHY ABC IS
"The Standard of the Industry"
Constant
Research
More than 29 years of intensive research
in the development of better oil burners
is a major reason why America's leading
heating manufacturers equip their
oil burning units with . . .
ABC
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complete
information
AUTOMATIC BURNER CORPORATION
1823 CARROLL AVENUE • CHICAGO 12 • ILLINOIS

more people are reading about HEIL

Attention-compelling HEIL advertisements in consumer magazines will be telling millions of people about HEIL Automatic Heat. A new booklet, "179 Ways to Cut Your Heating Costs," will get many tributes for its timely helpfulness. Local co-operative newspaper campaigns reinforce HEIL's advertising program.

more people are buying HEIL

1950 was the biggest year ever in HEIL production. More and more people are aware of HEIL quality . . . of the advantages of undivided responsibility in heating equipment manufacture . . . of the superiority of the heating line that has consistently been a leader in the industry. More and more people are saying, "I'm glad we bought HEIL Automatic Heat."

more and more dealers are saying

"I LIKE DOING BUSINESS WITH HEIL"

HEIL dealers sell one of the most complete lines of oil-fired and gas-fired heating equipment in the industry. They have a complete range of sizes and prices to offer. They have provable selling features that make HEIL's better quality obvious to their prospects. But more than that, they have a friendly, honest relationship with The HEIL Company that makes doing business in times like these a pleasure. When you do business with HEIL, you're not just a number in an account book. Write today and get complete details about a HEIL franchise.

Oil-Fired and Gas-Fired Winter Air Conditioners
Oil-Fired and Gas-Fired Highboys
Oil and Gas Conversion Burners
Gas-Fired Gravity Furnaces ... Oil-Fired Boilers

THE HEIL CO.

MILWAUKEE 1, WISCONSIN

District Offices: Hillside, Washington, D. C., Atlanta, Milwaukee, Detroit, Chicago, Minneapolis, Kansas City, Dallas, Los Angeles, Seattle

HILLSIDE, NEW JERSEY

YOUR *Buying Power* IS GREATER . . .

YOUR *Selling Power* IS GREATER . . .

with **MONCRIEF**

Series L Gas-Fired Steel Air Conditioning Unit.

Series U Gas-Fired, Steel Utility Air Conditioning Unit.

Series P Gun. Oil-Fired Air-Conditioning Unit Steel heating element.

Series W Gas-Fired Gravity Furnace Available with Steel or Cast Iron heating element.

No. CL-200 Gas-Fired Air Conditioning Unit with cast iron Heating Element.

Series AC-F Coal-Fired, Steel Air Conditioning Unit.

Series C Coal-Fired, Cast Iron, Gravity Furnace.

No. UC-95-E Gas Counter-flow Unit, for Floor Slab, Perimeter Heating.

No. VUC-75-E Oil Counter-flow Unit, for Floor Slab, Perimeter Heating.

Series No. 600 Coal-Fired Gravity Furnace. Steel Heating Element.

The complete Line of Warm Air Heating and Air Conditioning Units . . .

GAS . . . OIL . . . COAL

with CAST IRON or STEEL HEATING ELEMENTS

Feature for feature, you can't buy better than Moncrief.
Feature for feature, you can't sell better than with Moncrief.
There's a Moncrief unit built to meet practically any heating requirement — gas, oil or coal — for air conditioning or gravity installations — with steel or cast iron heating elements. And many Moncrief units are designed for burning either gas or oil — quickly convertible from one to the other.

If you want features to offer — Moncrief has them.
If you want quality to offer — Moncrief builds it.
If you want reputation for economical performance — Moncrief has that too.

Get the full facts on Moncrief from your jobber.

THE HENRY FURNACE COMPANY • *Medina, Ohio*

HEATING AND AIR CONDITIONING UNITS — MONCRIEF — FURNACE PIPE AND FITTINGS

Century 1/8 TO 3/4 H. P. MOTORS

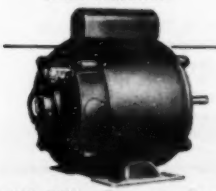
Choose From These Many Types to Fit Your Job

HEAVY-DUTY for Industrial and Appliance Use

From Century's wide range of types and sizes, there's a proper motor for all popular applications. You can be confident that the right Century motor will assure a long life of satisfactory performance.

Shown here are examples of Century's line of FRACTIONAL HORSEPOWER motors—ruggedly built for smooth, quiet operation, with a remarkable freedom from vibration

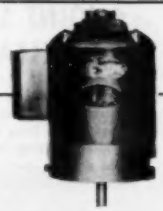
Century Electric Company is celebrating its 50th year in the electrical industry.



TYPE CSH — Capacitor Start Induction Single Phase Motor suitable where high starting torque and normal starting current is satisfactory.

TYPE SP — Split Phase Induction, Rigid Base, Single Phase Motors suitable for light starting duty.

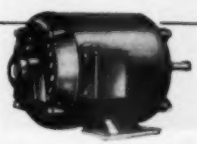
TYPE SC — Squirrel Cage Polyphase Motor built in fractional sizes for all torque requirements.



JET PUMP MOTOR—Capacitor Start Single Phase Motor available in sizes for practically every jet pump application.

TYPE SP — Split Phase Induction, Cushion Base, for quiet operation.

OIL BURNER MOTOR especially designed for this service. Compact, rugged; smooth, quiet starting and running.



TYPE RS — Repulsion Start Induction Single Phase Brush Lifting Motor suitable for applications requiring high starting torque and low starting current.

TYPE DM — Direct Current built in sizes and ratings for applications where direct current is available or its use desirable.

UNIT HEATER MOTOR provides smooth, quiet performance throughout a long service life.

GEAR MOTOR, compact, rugged, ball bearing equipped, for your high torque, slow speed requirements.

The complete line of Century motors includes a wide range of types and kinds, from 1/8 to 400 horsepower. They are available in open rated, splash proof, totally enclosed fan cooled and explosion proof frames.

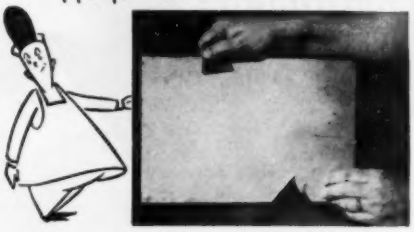
Specify Century motors for all your electric power requirements.

CENTURY ELECTRIC CO.
1806 Pine Street
St. Louis 3, Missouri

OFFICES AND STOCK POINTS IN PRINCIPAL CITIES

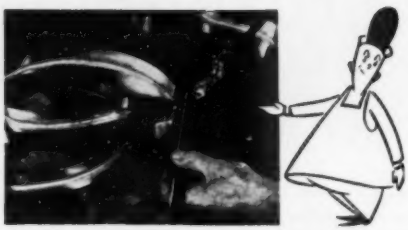
-482

Handy Facts on Soft Soldering ...by Stainless Sam



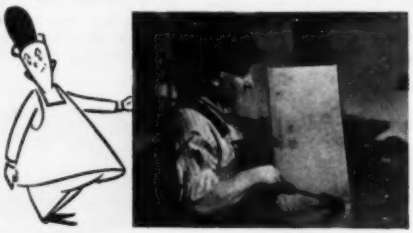
1 JOINT SURFACES SHOULD BE CLEAN AND ROUGH

For tight adherence of the solder, first clean all greasy matter from the stainless steel near the proposed joint. Next, unless sheets have a pickled finish, roughen joint surfaces by filing, rubbing with emery cloth or by grinding. Etching with muriatic acid is another "roughening" method, but metal requires careful cleaning after usage.



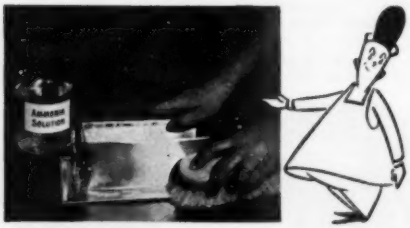
2 TIN CONTENT OF SOLDER IS IMPORTANT

For smooth, strong and bright joints in stainless steel work, a solder with 70% tin and 30% lead is best. But other analyses may be used satisfactorily. In general, soft solders should not contain less than 50% tin for stainless work. Solders low in tin content have reduced fluid properties and darken more readily when exposed to the atmosphere.



3 "TIN" BEFORE SOLDERING FOR EASY JOB

"Tin" or coat the edges to be joined with a thin film of solder. This makes solder flow more smoothly with better penetration. Also use strong fluxes that will cut through the chromium oxide film—orthophospheric acid, for example. Use a large hot iron and quickly flow the solder. Stainless heats slowly, but don't increase iron temperature.



4 REMEMBER TO WASH THE JOINT

Immediately after soldering wash the joint thoroughly with ammonia water, or with laundry soap and water in which washing-soda has been dissolved. Then rinse with water. This will neutralize and remove excess acid and salts, which if left would discolor and pit the stainless surface.

In the free Armco manual, "Stainless Fabricating Tips," you will find valuable hints on every stainless sheet metal fabricating operation. It is fully illustrated, easy to understand. Ask your nearest Armco Distributor for a copy. If you don't know his name, write us.

ARMCO STEEL CORPORATION

ARMCO

2761 Curtis Street, Middletown, Ohio • Plants and Sales Offices from Coast to Coast • Export: The Armco International Corporation

. . . for Commercial and Industrial Heating

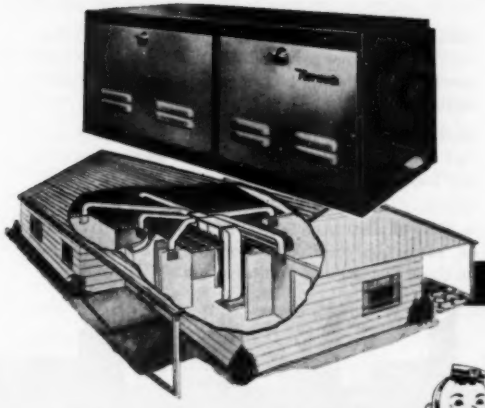
All the Advantages of a Central Heating System in ONE forced convection OVERHEAD GAS HEATER
(U.S. Patent #2519496)

NEW *Norman* "THREE-SIXTY"

CIRCULAR DESIGN DISTRIBUTES HEAT HORIZONTALLY IN A 360° RADIUS

- NO BLAST of hot or cold air with 360 degree horizontal heat distribution.
- FORCED EXHAUST of Combustion Products Eliminates Draft Divertor and Venting Problems.
- FLUSH MOUNTING AND SHALLOW DEPTH Allows Ample Head Room in Low Ceiling Applications.
- EASILY AND QUICKLY INSTALLED in New or Remodeling Installations.
- LOW VELOCITY Impeller Assures Quiet, Comfortable Air Distribution.
- SMART STYLING—Controls and Venting Completely Concealed.

STEP AHEAD WITH NORMAN



. . . for Space Saving Residential Heating

Norman SOUTHERNER

HORIZONTAL GAS FURNACE

The Original Compact Horizontally Designed Forced Air Gas Furnace for economical space-saving installation in attic, under floor, basement, closet. 4 sizes, 40,000 BTU to 100,000 BTU.

GET THE FACTS—MAIL THIS COUPON

NORMAN PRODUCTS CO.
Dept. A-2, 1148 Chesapeake Ave., Columbus 12, Ohio

I'm interested in "Stepping Ahead With Norman." Please send free literature giving full details and specifications on:

☐ Norman Three-Sixty ☐ Norman Southerner

NAME_____

FIRM NAME_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

COUNTERFLOW HEATING UNITS

LONG LIFE • HEATING ECONOMY • FUNCTIONAL BEAUTY

Now available! Prompt delivery and complete service are available on practically all Certified Furnaces. This great line is packed with the features that mean quicker, easier, more profitable sales!

LONG TROUBLE-FREE LIFE! Heavy boiler-plate furnace body with leakproof electrically welded seams. Furnace front permanently welded to main combustion chamber . . . prevents leaks, cuts installation costs. Large capacity blower driven by rubber-mounted blower.

REAL HEATING ECONOMY! Engineered for top efficiency. Counterflow principle pre-heats cold air in heat saver before filtering and heating. Uses heat usually wasted!

TRUE FUNCTIONAL BEAUTY! Attractive enameled cabinet takes up little floor space . . . adds beauty to any basement or utility room.

Certified Counterflow Heating Units are made in a full line of sizes from 90,000 to 1,750,000 B.T.U.'s—oil, gas or coal fired. Write for complete information on these fast-selling, profitable units.

A COMPLETE LINE OF WARM AIR HEATING EQUIPMENT

CERTIFIED FURNACE CO.

DIVISION OF STAINLESS & STEEL PRODUCTS CO.

1000 Berry Avenue St. Paul 4, Minnesota

News Round-Up

W. D. Redrup Resigns Office

THE NATIONAL WARM AIR Heating and Air Conditioning Association has announced that W. D. Redrup, Huntington, Ind., has resigned from his committee assignments with the group.

Mr. Redrup had been chairman of the Installation Codes Committee for 10 years and chairman of the Application Engineering Advisory Committee for 5 years.

Because of the close relationship between these committees, President Clarence Franke has combined them. Dean Lorin G. Miller, Michigan State College, has been named chairman of this new Installation Codes and Technical Education Committee.

Steel Scrap Crisis

WITH STOCKS OF IRON and steel scrap at about one-half of a safe working inventory the steel industry faces a critical situation. Collection of this raw material must be stepped up if production goals are to be reached.

Last year over 29 million gross tons of purchased steel scrap were consumed to produce approximately 96,700,000 tons of steel ingots and castings, the greatest production in history. The expansion program of the steel industry is aimed at a capacity of 117,500,000 tons by the end of 1952. Unless scrap collection increases there could be a scrap deficit of 5 to 7 million tons.

There are several sources abroad which could yield substantial amounts of scrap, but complications exist in securing and importing the scrap. The problem will probably have to be solved in this country. Every business which has potential scrap in the plant or on the premises should make a survey to determine what material can be turned over to scrap collection channels to aid in steel production.

Warm Air Furnace Shipments

THERE WERE 85,407 warm air furnaces shipped during the month of December, 1950. This brought total shipments for the year to 1,093,189 units. These figures have been compiled by the Bureau of the Census, Department of Commerce.

Breaking down December shipments by types of fuel gives the following percentages: coal fired units, 9,824 or 12 per cent oil fired units, 29,852 or 35 per cent; gas fired units, 45,731 or 53 per cent.

Forced air furnace accounted for 80 per cent of the month's shipments. Automatic heating totaled 88 per cent of shipments.

February Housing Starts

A BREAK IN national homebuilding activity occurred in February, when 80,000 new permanent nonfarm dwelling units were started, according to preliminary estimates of the U. S. Labor Department's Bureau of Labor Statistics. This figure was 8 per cent below that for the preceding month and was down slightly from February a year ago.

The February decrease was entirely in home construction by private builders, who started 76,000 new units in that month, compared with 83,700 units in January. A total of 4,000 public housing units was placed under construction in February, 700 more than in the preceding month.

This year's decline in February housing activity appears to be especially important, for the trend is generally upward in that month. Also, compared with January, weather conditions were generally favorable.

Officers Elected

THE PROPELLER FAN MANUFACTURERS' Association held its annual meeting on March 2, 1951 at Daytona Beach, Florida. The following officers were elected for the ensuing year: president, Parker T. Finch, Memphis, Tenn., vice president, B. G. Krause, Cleveland, Ohio, secretary & treasurer, L. O. Monroe, Detroit, Mich.

The association will continue to press for high standards in the industry and is presently sponsoring commercial standards for testing and installation.

Record Steel Month

JANUARY 1951, has become the month of largest steel shipments, totaling 6,904,688 tons, American Iron and Steel Institute has announced.

That amount exceeded the December total by nearly 500,000 tons and topped the previous record, made in October 1950, by 400,000 tons. These were increases of 7 per cent and 6 per cent, respectively, which were greater than the percentage rise in ingot output.

January shipments were featured by large increases in plates and structural shapes, as compared with

News Round-Up

December and previous months in 1950. These products were shipped in large quantities for use in railroad and industrial equipment. Shipments of most of the light products, also were larger in January than in December or other recent months. Shipments of both hot and cold rolled sheets set records in January, while shipments of pipe and bars were exceptionally large.

Shipments of alloy products other than stainless set a monthly record except for wartime, the total in January being 492,323 tons.

Aluminum Production Rises

THE ALUMINUM INDUSTRY'S expansion of production for defense needs is reflected in figures announced by Donald M. White, secretary of the Aluminum Association, revealing an increase of more than four million pounds in January over the previous month, and almost 32 million pounds, or 31 per cent over January 1950.

Production of primary aluminum reached 135,907,016 pounds in January as compared to 131,794,258 pounds in December, Mr. White reported.

"The increase did not come from any of the new facilities which the industry has scheduled but which will take several months to construct," Mr. White explained. "During January high-cost stand-by capacity was reactivated under special arrangement to produce metal for the national stockpile."

Shipments of aluminum sheet and plate by association member companies also showed an increase, rising from 102,022,815 pounds in December to 112,070,040 pounds last month.

Wholesalers Appointments

President Arthur M. Vorys of the National Heating Wholesalers Association has announced the following committee chairmen: credit and legal, A. L. Thys, Birmingham, Ala; trade relations, John E. Phillips, Philadelphia, Pa.; standardization and simplification, J. E. Eckstein, Pittsburgh, Pa.; wholesaler merchandising, A. O. Frederick, Detroit, Mich.; dealer education and training, Richard J. Young, South Bend, Ind.; membership and revision of constitution, George F. Wheelock, Birmingham, Ala.; codes and code standards, A. K. Anderson, Toledo, Ohio; new products information exchange, A. H. Johnson, Pittsburgh; convention and entertainment, A. G. Earnshaw, Mansfield, Ohio; Association publicity and advertising, Louis F. Demmler, Pittsburgh.

AGA Convention

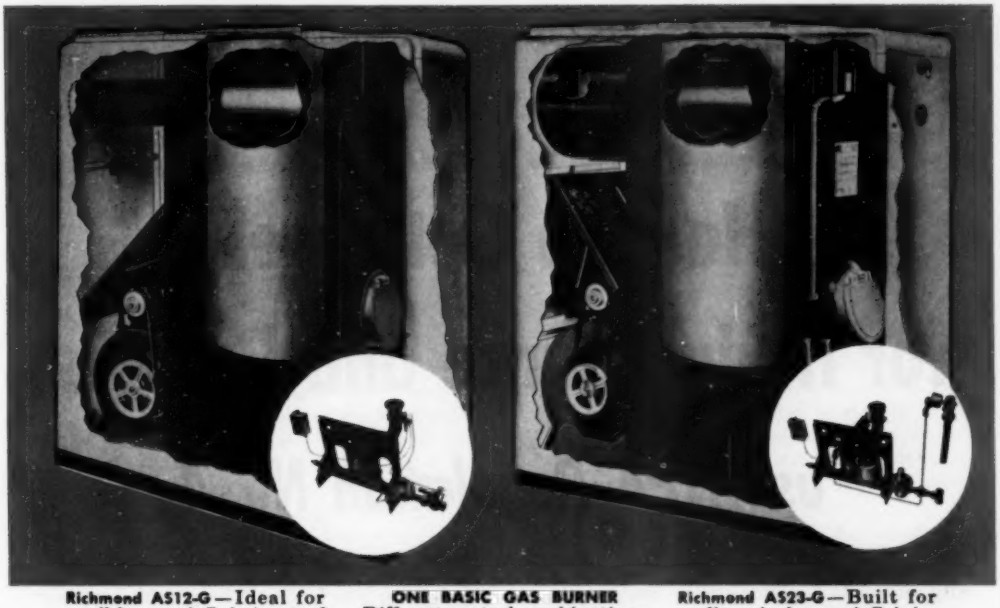
IN THE INTEREST of economy both in expenses and manpower in the light of general conditions, the thirty-third annual convention of the American Gas Association is scheduled for three days instead of four as originally planned. This announcement was made by Robert W. Otto, St. Louis, Mo., chairman of the AGA general convention committee. The convention will be held in St. Louis, Monday to Wednesday, October 15 to 17 inclusive. Headquarters of the association, convention registration and as many of the meetings as possible will be in Kiel Auditorium.

Progress was made in planning the convention in a recent meting in St. Louis. Because of the size of the convention it will be necessary to use a number of hotels, all within reasonable taxi distance of the auditorium. The committee has assigned the Statler Hotel as headquarters for the Accounting Section; the Jefferson Hotel as headquarters for the Residential Gas and the Industrial and Commercial Gas Sections; and the Mayfair and Lennox Hotels as the headquarters for the operating Section.

The St. Louis Convention Bureau has established a housing bureau to handle requests for reservations. A form will be approved by the committee to be filed with the housing bureau on a first come-first served basis. Registration fee will be $10 and advance registrations can be made with AGA headquarters.

The joint meeting of the Natural and Manufactured Gas departments and the general sessions meetings will be held at the Kiel Auditorium. General sessions will be held each of the three mornings, with two addresses on Monday and three each on Tuesday and Wednesday mornings.

Each of the four sections of AGA has been requested to hold not more than two meetings. Each section will have an opportunity to submit several subjects and speakers for selection by the general committee for general sessions programs. An employee relations session will be conducted at the convention, sponsored by the AGA personnel committee. The committee also approved the scheduling of an accident prevention session.



Richmond AS12-G—Ideal for small homes. A.G.A. input of 90,000 BTU/Hr.

ONE BASIC GAS BURNER
Different control combinations adapt this gas burner for either size of furnace, any type of gas, sea level or high altitude.

Richmond AS23-G—Built for medium-size homes. A.G.A. input of 115,000 BTU/Hr.

Available Now Two Steel Gas-fired Winter Air Conditioners by RICHMOND

These two Richmond gas-fired...steel...winter air conditioners are identical in their fine engineering features. Two sizes... AS12-G—90,000 BTU/Hr. input... AS23-G—115,000 BTU/Hr. input... cover most heating requirements. Study these quality features:

A. G. A. APPROVAL—both units are fully approved by the American Gas Association.

HEAT EXCHANGER made of heavy 12-gauge steel for maximum durability. All seams welded full length. Transmits heat quickly and efficiently to circulating air.

BURNER AND CONTROLS are easily removed for service. Mounting plate is held securely in place with four nuts permitting quick removal.

WHITE JACKET of rugged steel construction, streamlined and rounded at the corners. Finished in lustrous white enamel, baked on for long life.

RICHMOND PLUMBING & HEATING

RICHMOND

RICHMOND RADIATOR CO.—AFFILIATE OF REYNOLDS METALS CO.

Richmond Radiator Company AA-4
19 East 47th Street, New York 17, New York
Please send me full information on the Richmond steel, gas-fired winter air conditioners, AS12-G and AS23-G.

Name.....

Company.....

Address.....

How to Get Steel for Maintenance and Repairs

use NPA Regulation No. 4

Any business—large or small—may now use a DO rating to obtain limited quantities of steel for maintenance, repairs and minor capital additions. The rating to apply is DO-97 as authorized by the NPA's new Regulation No. 4.

Obviously the use of this rating does not automatically get the steel because it is impossible to maintain complete stocks under present conditions. However, it does assure your order of preference over unrated orders and equal treatment with all other orders bearing a priority rating. If we have the steel you get it. Moreover, we can in turn extend the rating which should help us to maintain stocks for your future needs.

Because of broken stocks, we suggest you give us alternate sizes, gauges and qualities that would be acceptable. In this way you increase the chances of getting steel you will be able to use.

And remember, if your order falls within the provisions of Regulation No. 4 take advantage of it—use your rating! You can be sure that we will make every effort to take care of you as promptly and fully as possible.

If you do not have this Regulation No. 4 we will be glad to send you a copy.

PARTIAL LIST OF PRODUCTS—BARS • STRUCTURALS • PLATES
SHEETS • TUBING—IN CARBON, ALLOY & STAINLESS QUALITIES

RYERSON STEEL

STEEL-SERVICE PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI • CLEVELAND
PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

AMERICAN ARTISAN

Current Status Of Controls

ORDERS issued by the National Production Authority affecting the warm air heating and sheet metal industry restrict the availability and end-use of materials.

The following analysis of these orders gives the current status of regulations for the second quarter of this year. It is rumored that a controlled materials plan will be put into operation for the third quarter of the year to allocate all materials on a basis of need.

Whether there is sufficient time before July 1 to put this plan into operation and whether it will solve the supply dislocations that now exist remains to be seen. On the whole, experience with CMP during World War II was good and it did an adequate job of distributing available supplies fairly.

Steel. NPA M-1. Regulations for April, May, June, 1951.

Reserved at the mill for rated (defense) orders —
Galvanized steel sheets — 10 per cent
Hot rolled sheets — 25 per cent
Cold rolled sheets — 15 per cent
Sheets (other coatings) — 13 per cent
Tin and terne plate, hot dipped — 5 per cent
Tin plate, electrolytic — 5 per cent

Prohibited products — There are no restrictions on use of steel in any form.

Warehouse stocks — Steel producers are required to allot and ship each month not less than 85 per cent of a warehouse's base monthly tonnage of carbon steel, including DO orders. Base period is January 1 to September 30, 1950.

Aluminum. NPA M-7. Second quarter.

Permitted use — 65 per cent of base period (first 6 months of 1950)

Prohibited products — List A: architectural ornamentation; caps, chimney and vent flue; cornices and copings; gutters, leaders, and downspouts; residential roofing; residential siding.
List B: Ductwork; windows.

Deadline for production of prohibited products — Items on list A can be produced after May 31 *only* if the aluminum was in inventory before April 1 and is unsuitable for other use. Also exempt is material which was on a producer's schedule in the first quarter and is delivered to a fabricator before May 1.
List B: Aluminum ductwork for heating, ventilating, and air conditioning systems can be completed until June 30 if fabrication or assembly is begun by April 30. Production of ductwork is limited, however, to 65 per cent of the amount made in the first 6 months of 1950. After June 30 aluminum cannot be fabricated into ductwork.

Copper. NPA M-12. Regulations for second quarter, 1951.

Permitted use — 75 per cent of quantity first half of 1950.

Prohibited products — All architectural or decorative products and all building applications.

Deadline for production of prohibited products — April 1, unless the copper was in inventory by March 1 and unsuited for other use. Also exempt is material in a producer's schedule in February which was delivered by April 1.

Exempt products — Tubing and fittings for tank to oil burner hook-ups. The following types of flashings: cap and base flashing for built-up roofing; through-wall flashing in parapet walls; flashing for chimneys, vent stacks, and all other vertical surfaces rising through roof levels; roof-to-side wall flashing; valley flashing for slate, tile, and cement shingle roofs; door and window head flashing; expansion joint flashing.

Tin and Terne Plate. NPA M-24. Second quarter, 1951.

Reserved at the mills for rated orders — 5 per cent of production.

Restrictions on metal content — Only secondary tin can be used in the manufacture of terne metal. No terne metal containing more than 15 per cent tin can be used in tin mill coating machines or for coating roofing ternes. No terne metal containing more than 10 per cent tin can be used in sheet mill coating machines.

Permitted products — Smokepipe elbows and fittings can be manufactured of long ternes with a maximum permitted coating of 10 lbs per base box. Roofing, gutters, downspouts, and roof flashings can be made of roof ternes with a coating of 10 lbs per base box.

(*Please turn to page* 156)

Layout Of Advertisements

DAVID MARKSTEIN

HOW the advertisement is laid out—arrangement of illustrations, copy, headline, price, and signature—is an important factor in determining how many people will see it, read it, and be moved to action.

The whole aim of advertising layout is to arrange the elements of an advertisement into a pleasing whole that will attract attention and guide the readers' eyes into the selling copy. Too many *Indoor Comfort* advertisers devote care and attention to the copy and to the headlines, only to put them together in such a fashion that few people can wade through the resulting confusion to the point of the message. The importance of layout was proved in a recent test when the readership of national magazine ads was surveyed.

Factor in Layout

Illustration is an example of one of many layout factors that was studied in this test. It is an axiom of advertising that the best illustrations are pictures that tell how the prospect will be benefited by buying. Researchers found just how true this axiom is. The degree to which illustrations in these ads told a story made a considerable difference in whether people read the ads. Those with no story-telling illustrations compiled an index count of only 78.2 per cent. But the ads with layouts built around story-telling pictures rated 108.7 per cent on the index scale.

Printers' Ink is a national publication read by advertising men. Recently, this authoritative magazine listed six layout suggestions as guides for the people who advertise in *Printers' Ink*. They were:

1. Use *headlines* that lead naturally and logically into the copy. Make the main point of your advertisement in the headline. Use stoppers, but don't leave your reader suspended in mid-air; carry him easily into the copy.
2. Use honest, dramatic, and convincing *pictures* that illustrate your sales story, not just ornament it.
3. Select *type faces* for easy reading and clean appearance.
4. Use *color* when it contributes to the sales story, not just to make the advertisement pretty.
5. Have your *layout* make the advertisement easy to read and understand, with headline, illustration, copy, and typography working together for unity.
6. A *similarity* among the advertisements in a campaign will make a greater impact upon the reader. Get that resemblance by effective use of headline, layout, picture treatment, typography, logotype.

Order Is Needed

Since it is the job of the layout to make your ad easy for the prospect to read, rule one is that the layout be *orderly*. This is a rule sometimes forgotten by even advertising professionals in their search for tricks to make one ad stand out from others. How much it costs to forget this rule was proved not long ago when the Advertising Research Foundation set out to find the most-read advertisements in a widely-read newspaper in the Midwest.

True, all of the ads were food messages. But food advertisements are read by the same people whom the *Indoor Comfort* dealer hopes to attract with his own newspaper insertions. For that reason, there is an important advertising lesson to be learned from the study.

The food store ad that rated highest in readership was seen by 21 per cent of the men and by 52 per cent of the women who bought the paper that day. The next ranking ad occupied one-third more space than the winner. But this added space was taken up by decorations such as a wide, slanted panel. In other words, the attempt to make the ad stand out, at the sacrifice of legibility and order, only reduced readership, in spite of the fact that advertisement number two was a third larger than the winner.

The worst-read ad was so cluttered with reverse (white on black) panels, fancy borders, slanted columns, and screaming bold type that good order was almost non-existent.

The seven food advertisements ranked for readership almost in direct proportion to the degree of good order in their layouts.

Logical Progression

Movement is a desirable quality in every layout. A layout has movement when it is arranged so that the eye is led from the headline (usually the first thing to attract the reader), to the illustration, to the selling copy, to the price, and to the signature. Everything should be designed to get the reader down into the selling copy. All of the other advertising steps are preliminary to this. The copy carries the selling load.

Movement is provided by arranging things which attract the eye, such as headline and illustrations, in a pattern that takes the eye by natural stages to the payoff point.

There are many kinds of conventional and unconventional layouts. Conventional layouts for *Indoor Comfort* advertising can be divided into two groups, single-item advertisements and multiple-item ads.

In the single-item ad, there is only one illustration, one headline, one

price, one block of copy. There are many good ways to arrange them.

An unusual approach is to place the illustration at the bottom of the ad, with headline, copy, price, and signature above. Or the illustration can be to one side. Or, in more usual fashion, at the top. The headline can be hand lettered, set in type, put into a box, underscored, or set up in the style of a news story head. There are a hundred variations.

Planned movement really pays off in the multiple-item layout. The illustrations should be arranged in a pattern to carry the eye from the point at which the headline stops it, through each block of descriptive copy, and finally to the signature.

In the multiple-item layout, experience in the heating field has shown that offering the reader a single standout idea to catch his eye results in increased sales of every advertised item. That idea can be an overall headline which tells a selling story related to the ad as a whole. An alternative method is to pick one of the items as a big feature, and use a third to a half of the ad to emphasize this.

Out Of The Ordinary

Many unusual layout methods have been used with success. One advertiser set his ad up like a sheet of music, with the lyrics telling the sales message. The song sheet format formed a layout pattern for two facing pages.

Another advertiser capitalized on the fact that his small space was approximately the same size and shape as a crossword puzzle to arrange a crossword pattern spelling out the sales story. This advertiser didn't bother with the "down" words. He simply set up "across" messages. Sales results were excellent.

A third took advantage of the popularity of picture magazines to design a layout in the style of a story from *Life* magazine, using photographs to put across the sales punch, with *Life* style headlines and picture captions.

Frequently an ad is set in editorial style. This trick has been used for

Unusual headline effects can be obtained with virtually no expense for artwork by a simple method the author describes.

one column insertions, and for smashing page ads.

Should the layout be long and narrow, broad or square? That depends almost entirely upon the merchandise to be featured in it. A long advertisement has one advantage: It reaches high above competing ads to catch the reader's eye. But a tall advertisement is unwieldly. It is not natural for the reader's eye to travel down in a straight line from tip top to bottom.

A broad format often makes it possible to put more punch into the layout. But such an ad is almost sure to be buried under an avalanche of competing advertisements, because newspaper make-up men try to pyramid the ads, from a broad base at the bottom of the page to a peak near the top.

Most *Indoor Comfort* dealers like to put the headline at the top of the ad. Tests show that the reader's eye stops first at a spot slightly above and slightly to the right of the exact center. A headline placed at this strong spot will get more attention than would the same head in any other part of the layout. Since the headline is the strongest single attention factor in the layout, its design as well as its location should be studied carefully.

There are many tricks that advertising layout men use to make the headline punch across its sales message. These include hand lettering, boxing-in the head, and making the cold type talk.

With a few minute's work, you can often duplicate the work of highly paid artists in making headlines talk.

Strengthening Headline

A small town *Indoor Comfort* dealer recently reported to colleagues on how he produced unusual headlines with no professional art staff to help him:

"First I write the headline, then decide upon the space it should occupy in my layout," he said. "Then I pick out a pleasing type face and have the newspaper's composing room set the head using the type I have chosen in a size to fit the space. They pull a proof of the type on enamel stock and send it back to me.

"When the ink has dried on the proof, I go to work. Tools? Just an artist's pen that costs ten cents. With it I draw wiggles and lines, using either black or white India ink.

"If the word *cold* occurs in the headline, I can make that type talk by drawing snow dripping from the letters. To simulate speed, I draw straight lines breezing back from the end of a word, as if the wind were blowing them. Then I have an engraving made. Anybody can do it."

Payment In Full

ALBERT W. GRAY
Jackson Heights, L. I.

In disputes about completion of contracts the matter of payment often enters. Several aspects of legal opinion are offered here.

A CONTRACTOR sent a bill to a customer for the installation of an air conditioning system in Tacoma, Washington. The contractor had undertaken the work with the agreement that the price should be the cost of the labor and material. Labor difficulties later forced him to subcontract the job to another installer.

The work was not satisfactory. The system failed to operate properly and in spite of efforts to remedy the defects, dissatisfaction continued. Ultimately the owner had the entire system removed and installed a new one.

When the original contractor subcontracted the work to another installer, an amount of $402.25 was due him for labor and material already furnished. The owner paid this bill. Later after the subcontract had been completed, the original contractor sent another statement for $1,900.35 on which he credited the payment of $402.25 plus additional items, bringing the total credit to $704.65, leaving an unpaid balance of $1,158.70.

Account in Full

This bill the owner paid immediately and endorsed on his check, "Account in full." The contractor accepted the check. Then the owner sued for the total amount he paid, claiming a breach of warranty by the contractor, or in words of the court, "that he had not received what he had bargained and paid for."

The contractor's defense to the action was that the transaction had been closed by his receipt and acceptance of the check with its endorsement, "Account in full."

This check, the court said, did not settle all the obligations. It did settle the contract account, but it did not relieve the contractor of his obligation to give the owner what he had bargained for and had not received. To effect a full and final settlement of this character there must be a new contract with a new consideration.

A settlement of an account for less than the amount claimed by the creditor must be an agreement to that effect before it is binding. Under such agreement both the creditor and debtor make mutual concessions which represent a consideration for settling the dispute.

A situation of this character was before a New York court a short time ago. There a customer rejected part of an order but sent a check, stating that it was in full payment and that the rejected goods were held subject to disposal by the manufacturer. In the letter which accompanied the check the customer wrote, "Of these forgings there are about 2,000 that cannot be used and they are at your disposal."

Later the manufacturer sued to recover for these 2,000 forgings which the customer, although asserting them to be held subject to the manufacturer's order, had nevertheless retained.

Neither in this instance nor in the Washington case did the acceptance and the cashing of the check represent a settlement of the account. It was not a completed contract. The consideration for the settlement of this bill for the forgings was not only payment but return of the rejected merchandise. This the buyer had failed to do. The check he had sent had been but a part of the agreement.

Settlement Must Be Understood

The principle of this rule was summarized by the Kentucky Court of Appeals, "The tender of a sum less than the contract price in settlement of a disputed claim must be accompanied by a statement, not which may be understood by the creditor as intended to be in full settlement and satisfaction of the claim, but which *must be* so understood by him.

"That is, the settlement must be so clear, full and explicit that it is not susceptible of any other interpretation. To hold otherwise would put it in the power of a sharp, shrewd person frequently to take advantage of the ignorant, uneducated or unwary and pave the way in the business and commercial world for the perpetration of frauds rather than the honest settlement of disputes."

Not only must there be a clear and certain understanding that payment is made in full settlement but the payment must be made in full settlement and in payment of an account that is in dispute. A promissory note with both validity and amount unquestioned, never has and never will be settled by the payment of half

or a part of the amount admittedly due, irrespective of "payment in full" or any other legend endorsed on it.

Machine equipment was delivered by a manufacturer to a Louisiana dealer, invoiced at $2,092.50. Later a salesman of the manufacturer told this customer that, as he was closing out his business, the machinery he had on hand that remained unsold, could be returned to the manufacturer and credited on his account. This the customer did.

In a letter advising the manufacturer of the return of the equipment he enclosed a check on which he endorsed,

Inv. 95,675	$2,092.50
Parts returned for credit	1,825.42
	267.08

and the statement, "This check is in full settlement of account as shown herein. Acceptance by endorsement constitutes receipt in full."

The check was accepted and deposited by the manufacturer, but in acknowledgment of the payment the manufacturer replied that the parts shipped for credit were being returned to this customer since the salesman had no authority to offer a credit allowance for the return of this merchandise.

When later the manufacturer sued to recover the balance represented by this returned merchandise, the court held that the account had been closed and no money due the manufacturer.

"It is one thing to inform a creditor, when sending a check, that the debtor will not pay any more," said the court, "and a very different thing to advise him that the check is sent upon the condition that if he accepts it, he will do so in full settlement of the account.

Three Elements for Settlement

"It is apparent to us," the court concluded, "that there are present in this case the three concurring elements necessary for a settlement. First there is a disputed claim between the parties to the contract; second, a tender was made in full settlement of the claim and, third, the tender has been accepted."

A Pennsylvania incident illustrated clearly these three principles mentioned in the Louisiana case, the disputed account, the offer of settlement, and the acceptance. A plumber had been hired and nothing said or agreed upon in relation to cost. When the work was completed the plumber sent a bill for $163.00.

The customer objected to the amount as being too high and asked for an itemized statement. This the plumber sent, showing items totaling $175.00. The customer telephoned that $100 was a reasonable amount for the work and that he was sending his check for that amount in full settlement.

The plumber protested that he would not settle for $100. Nevertheless when he received the check endorsed "Payment in full," for $100, he struck out the endorsement, deposited the check and sued for the remaining $75.00.

Of the controversy in the case as to whether or not this was a disputed account the Pennsylvania court said, "When it is admitted that one of two different sums is due but there is a genuine dispute as to which is the proper amount, then the demand is unliquidated within the meaning of the term, as applied to an unsettled account."

Then in reference to the acceptance of this check by the plumber after his statement that he would not settle for the $100 it represented, the court added, "Acceptance by a creditor of any performance tendered by a debtor as a satisfaction of a preexisting contractual duty is not prevented from operating as a satisfaction by the creditor's manifest refusal to so regard it."

An interesting modification of this law that while an agreed and liquidated amount cannot be settled in full by the payment of a lesser sum, if the payment in settlement of such an agreed amount is made by the transfer of some article or the performance of some service of an undetermined value and made or performed in full settlement of the account, the account will be settled in full.

Indefinite Value

In 1495 in England, a court laid down this rule that is still the law: "An action is brought for £100 and an offer of settlement for £50 has been made. The payment of £50 cannot be a satisfaction of a debt for £100," said that court. "But if it were a horse instead of the £50 that is offered, that is a good satisfaction for it does not appear whether the horse is worth more or less than the sum under demand. And notwithstanding that the horse may be worth only a penny, that is not material for the value is not apparent."

A hundred years later this law that still governs the settlement of disputed accounts in business transactions today took on an enduring form from a famous Pinnel's case, in which a later English court said, "Payment of a lesser sum on the debt, in satisfaction of a greater, cannot be in satisfaction for the whole, because by no possibility can a lesser sum be a satisfaction for a greater sum, but the gift of a horse, a hawk or a robe in satisfaction, is good."

From this ancient ruling has come the law today, that the payment in full of an account by a sum less than that demanded by the creditor, must contain three features. The payment must be offered in full settlement, it must be accepted with this condition so obvious to the creditor that its import is inescapable, and last, the account must be a disputed account."

References

Plotkin v. Green, 217 Pac. 2d 611, Washington, May 1, 1950

Smith v. Brandenburg Instrument Co., 50 N.Y.S.2d 264, New York, July 31, 1944

Sanders v. Standard Wheel Co., 151 S.W. 674, Kentucky, December 17, 1912

Hutchinson v. Culbertson, 55 Atl 2d 567, Pennsylvania, November 12, 1947

Year Book, 10 Henry VII, f.4, p. 4.

Advertising For Help

PAUL LOCKWOOD

RECRUITING PERSONNEL is always a problem for *Indoor Comfort* dealers, and in times of acute labor shortages the task becomes even more difficult. Of course, by scraping the bottom of the barrel you can usually hire some low caliber help. However, most progressive dealers are now developing plans to search for replacement personnel.

One of the most effective methods of recruiting help in the air conditioning and heating industry is through the use of the help wanted column in the local daily newspaper. These advertisements have a high readership, ranking with the front page headlines and the comic strips, everyone reads the classified ads.

Regular advertisements in your daily newspapers try to attract the attention of the readers and turn then into red hot prospects. Not so with classified advertising. Here you are telling your story to a group of people who are prospects and are definitely in the market for what you are advertising — a job.

Yet, even with this high readership of potential wage earners there are many classified advertisements that do not produce results. Advertising day after day for an employee may attract a few inquiries, but perhaps by changing the content of the advertisement one day will be enough.

To illustrate, here is an advertisement that appeared recently advertising for a secretary:

STENOGRAPHER: 5 day week, good salary, excellent working conditions. Write Box X-4328.

If this advertisement was the only one appearing in the paper that wanted a secretary and jobs were hard to get it might be effective. However, here was another advertisement that appeared immediately below:

STENOGRAPHER: $60 a week, hours 9 to 5, Saturdays off, downtown office, two weeks vacation, pension plan. Write Box X-5339 giving education and experience.

Now suppose Mary Jane is looking for a new position. She picks up the evening paper and looks over the help wanted columns for a new position. Since Mary Jane has been doing secretarial work she will naturally look in this section of the help wanted column.

Which advertisement will she answer?

Obviously Mary Jane will answer the second advertisement first because it tells her what she wants to know. The other job may be just as attractive, in fact it may pay $65 a week, but Mary Jane may not have time to write two letters so she writes one for the position she knows she would like to have.

Here are some suggestions that you will find helpful in preparing your own help wanted advertisements:

1. *Tell The Whole Story*

You wouldn't be advertising for an employee if you didn't have something to sell, a job. When you prepare your advertising to sell a furnace or an air conditioning unit you include all of the details that will help sell the product or service.

Why not include all of the details of the position you are selling?

Here are some of the details prospective employees want to know:

Type of work, starting salary, possibility of advancement, job security, working conditions, hours of day, days of week, benefits for employees, and location of the position.

2. *Be Specific*

An advertiser who would take the details listed in the last paragraph could work up a help wanted advertisement something like this that would have a lot of details:

Heating equipment salesman wanted, good starting pay, chance for advancement, pleasant working conditions, excellent employee benefits, central location, regular hours. Call BEacon 5-1593.

That covers a lot of ground and makes a lot of vague promises. However, it will not attract the largest number of applicants because it does not tell the prospective employee anything he wants to know about the position.

What is the starting salary? What benefits are there for employees? Vacations? How long? Insurance? How much? What advancement? When? What is "central location"? What are regular hours? Midnight to eight? Nine to five?

A revision of this advertisement with the details given specifically would bring in applicants who would want the job. It would insure getting consideration by all readers of the help wanted column, and it would save time and money for the advertiser.

3. *Be Consistent*

One advertisement may not bring in any applicants, or it may not bring in the right type of applicant. How-

ever, surveys have shown that about 50 per cent of newspaper readers read some classified advertising every day. These readers may not read the help wanted column every day, but they will read classified advertisements at some time during the week.

There is always this possibility in advertising for help. The night your advertisement appears your best bet for a future employee may not read his newspaper. However, a friend of his may notice the advertisement and tell him about it. The next evening your prospective employee will look over the help wanted column carefully searching for your ad.

Now, if this prospective employee finds your advertisement, you will have a new employee. But, if your ad isn't there he may see another attractive advertisement and you will have lost this prospective employee forever.

4. *Don't Try too Hard for Position*

Some help wanted advertisers study their local newspapers and discover that all advertisements are listed alphabetically on the basis of the first word. Armed with this fact these advertisers will insert an advertisement something like this:

AAAA WELDER WANTED:

People who are reading the help wanted column for some specific kind of a job will not notice this advertisement. It will attract people who want a job, any kind of a job, but not experienced welders.

Welders, on the other hand, will look toward the end of the help wanted column for the "welding" classification first, because they know from their own past experience that the welding positions are listed under "Welders Wanted" in the W's — not in the A's.

Using the key word as the first word in your help wanted advertisement will insure good readership — readership of good employees, or good prospective employees. It will eliminate a lot of needless interviews or letter reading, and it will reach the right man or woman quicker at less cost.

5. *Make It Easy to Apply*

During times of unemployment many employers hesitate to list the name of their firm in their help wanted advertisement. This is done because they receive thousands of applicants for positions and it takes time to screen these people for the best individual.

However, during times of critical labor shortages most employers make it as easy as possible to apply. Giving the name of the firm, its address, telephone number, and the name of the individual to interview makes it easy for the prospective employee to act. And, it will make classified help wanted advertisements produce results.

1950 FURNACE SHIIPMENTS

A NEW YEARLY HIGH was reached in shipments of warm air furnaces during 1950. Total shipments were 1,093,189 compared to 844,476 in the previous record year, 1947.

In weighing 1950 shipments with 1949 a marked trend was the increase in automatic heating, i.e., oil and gas fired units. There were 202,998 coal fired furnaces shipped in 1949 against 138,367 in 1950; 217,655 oil fired units in 1949 and 538,039 in 1950; 297,132 gas fired units in 1949 and 596,783 in 1950. The trend toward winter air conditioning also continued. Gravity units equaled 274,433 in 1949 and 262,568 in 1950. Forced air units totaled 446,576 in 1949, 831,762 in 1950.

1950 WARM AIR FURNACE SHIPMENTS

Month	Total Units	Air Circulation in per cent		Type of Fuel in per cent			Automatic Heat
		F W A	Gravity	Solid	Oil	Gas	%
January	39,887	71	29	15	34	51	85
February	45,618	70	30	15	31	54	85
March	59,982	74	26	9	31	60	91
April	58,798	73	27	8	26	66	92
May	78,349	73	27	9	27	64	91
June	98,517	75	25	9	31	60	91
July	102,304	77	23	13	34	53	87
August	146,635	74	26	16	31	53	84
September	139,014	76	24	14	32	54	86
October	137,915	78	22	14	37	49	86
November	102,001	78	22	14	37	49	86
December	85,407	80	20	12	35	53	88
1950 total	1,093,189	75	25	13	33	54	87
1949 total	717,703	65	35	31	29	40	69

AGA-API Fuel Reserve Report

PROVED RECOVERABLE natural gas reserves on December 31, 1950 were 185.6 trillion cu ft, an increase of 5.2 trillion cu ft over estimated reserves of 180.4 trillion cu ft a year earlier, according to estimates shown in a joint report of the Commitee on Reserves of the American Gas Association and the American Petroleum Institute. These reserves are the highest on record and the gain over a year ago was registered over a record production of 6.89 trillion cu ft of natural gas during 1950. In 1949 production of natural gas was 6.4 trillion cu ft.

New Records

The AGA committee on reserves estimated proved recoverable reserves of natural gas liquids also attained a new record of 4.27 billion barrels as of the end of 1950. This compares with 3.73 billion barrels on December 31,1949, and the increase was made despite record production of 227 million barrels of natural gas liquids last year. Crude oil reserves on December 31, 1950 were estimated at 25.26 billion barrels compared with 24.65 billion barrels at the end of 1949. Total estimated liquid hydrocarbon reserves on December 31, 1950 were 29.54 billion barrels compared with 28.38 billion barrels a year earlier.

Discoveries of new natural gas fields and new pools in old fields accounted for an increase of 2.9 trillion cu ft last year, while extensions and revisions of previous natural gas estimates in existing fields accounted for 9.2 trillion cu ft. Estimated reserves of natural gas in underground storage at the end of 1950 were 54.3 billion cu ft greater than on December 31, 1949.

Additional Distribution Capacity

Despite increased production, proved reserves of natural gas and natural gas liquids were again reported to be larger at the end of 1950 than twelve months earlier. Increased production of natural gas was largely attributable to opening of several new pipe lines during the year and to the increased capacity of several existing systems. In addition, impact of the defense effort has brought with it heightened industrial demands for natural gas.

The division of natural gas reserves and production is set forth in the following tables:

Natural Gas

	December 31, 1949	December 31, 1950	Increase 1950 Over 1949
	(Thousands of cu ft)		
Reserves, natural gas	180,381,344,000	185,592,699,000	5,211,355,000
	1949	1950	Increase 1950 Over 1949
Production, natural gas	6,245,041,000	6,892,678,000	647,637,000

The production figures for 1950 are net after deducting the amount of gas returned to reservoirs for cycling and pressure maintenance.

Liquid Hydrocarbon Reserves

Reserves	December 31, 1949	December 31, 1950	Increase 1950 Over 1949
	(Barrels of 42 gallons)		
Crude oil	24,649,489,000	25,268,398,000	618,909,000
Natural gas liquids	3,729,012,000	4,267,663,000	538,651,000
Total liquid hydrocarbons	28,378,501,000	29,536,061,000	1,157,560,000
Production	1949	1950	Increase 1950 Over 1949
Crude oil	1,818,800,000	1,943,776,000	124,976,000
Natural gas liquids	198,547,000	227,411,000	28,864,000
Total liquid hydrocarbons	2,017,347,000	2,171,187,000	153,840,000

Arnold Kruckman's

Washington Letter

Federal Reserve vs. Treasury

THIS correspondent must confess that the glittering language about the technique of finances is just as much gobbledygook to him as are those confusing laws sometimes introduced in Congress, or the documents issued by Federal agencies. In ancient times the priests of Egypt and Babylon, and even Greece, used to wrap the esoterics of their religious philosophy in deliberately mysteriously confusing terms. One often wonders if the banker and the economist have the same idea. Would it not be a service if someone would attempt to teach these priests of high finance how to express themselves in simple terms?

Recent Retirement

The pressure of public opinion has forced lawyers to humanize their language. Perhaps pressure of public opinion may do the same to the bankers and economists. All this moralizing is provoked by the recent retirement from the Board of Governors of the Federal Reserve System of Chairman Thomas B. McCabe. Mr. McCabe is one of the wisest and most humane men who has graced the service of this administration. He is a Republican. He goes back to his job as head of a very large paper mill in Pennsylvania with practically a spotless reputation. This is so extraordinary that it warrants special comment.

You may have noticed almost always when an official in a high position retires from the service of this administration, because of a difference of opinion, the government agencies, working through those columnists who advocate the doctrines of the administration, attempt to cast reflections on the reputation of the outgoing official. It happens so invariably that the retirement of McCabe is historic. He goes out without a single unpleasant comment. Yet, he leaves because he cannot perform under the circumstances that were indicated by the President in regard to the bond pegging technique desired by Secretary of the Treasury Snyder.

It appears that the pegging of the bonds would materially increase the momentum of inflation. On the other hand, to let the bonds sink to their own level would do little harm to their holders but would notably aid in arresting inflation. Snyder, really a sort of amateur banker in private life, wanted the bonds pegged. Apparently he wanted the bonds pegged to hold up the prices in order that more government bonds might be floated. Obviously, if the prices held up, people would be inclined to invest more of their rapidly depreciating money in government bonds, supposedly the most secure of investments. McCabe and the Federal Reserve Board, on the other hand, held that this proceeding would lead us into more inflationary trouble, and into greater troubles of rapidly depreciating money whose end no one could foresee.

The Problem

The debate between Snyder and McCabe was involved and prolonged. Finally the President wrote a remarkable memorandum. In it he said the problem was reconciling two objectives: first, the need to maintain stability in the government security market and full confidence in the public credit of the United States, and, second, the need to restrain private credit expansion at this time. He asked the secretary of the treasury, the chairman of the federal reserve board, the director of defense mobilization and the chairman of the council of economic advisors to study ways and means of reconciling the two objectives, hoping, in the meantime, "no attempt will be made to change the interest rate pattern, so that stability in the government security market will be maintained."

Possible Action

Among other things, the group was asked to consider specifically these measures: 1) To limit private lending through voluntary actions by private groups; through government-sponsored voluntary actions such as was done in a narrow field by the Capital Issues Committee of World War I, and through direct government controls; and 2) to provide the

Washington Letter

Federal Reserve System with powers to impose additional reserve requirements on banks.

What he wanted had already been started as far as the first suggestion by several bankers organizations; the second suggestion was a far broader application of an obscure operation during World War I. In discussing "direct Government controls over lending," he said, "Furthermore, I should like you to consider the necessity and feasibility of using the powers provided in the Emergency Banking Act of 1933 to curtail lending by member banks of the Federal Reserve System. These powers are vested in the Secretary of the Treasury subject to my approval. . . The program could be extended to institutions other than member banks, if desired, by using the powers provided by the Trading with the Enemy Act."

Acts Never Repealed

The foregoing quotation should be read carefully. You probably do not know that neither set of powers mentioned in that paragraph has been specifically repealed. The banking emergency of 1933 never has been declared at an end, and the national emergency powers in the 1917 legislation were invoked in a Presidential proclamation issued last December. Unquestionably they were not repealed due to the neglect of those who should have attended to it. In the words of the monthly letter of the National City Bank of New York "The suggestion that these extraordinary powers are applicable to the present situation is startling."

The Federal Reserve System is an independent agency, theoretically responsible to Congress. It carries out responsibilities given to it by the Congress. In the *New York Herald-Tribune* of March 1, 1951, Walter Lippman writes this: "Mr. Truman does not, it appears, recognize that the Federal Reserve is an independent establishment with duties which are laid upon it by the law, duties which it cannot, or at least should not, abandon because the President asks the Board to do so.

"If the President believes the emergency is such that the Federal Reserve System should cease to be independent, and should become, as Senator Glass put it, a Bureau of the Treasury, then he should accomplish that by asking Congress to amend the law and not by pressure from the White House."

Senator Douglas, the vigorous and forthright member from Illinois, on February 22, 1951, told the Senate: "Over the shoulder of the present reserve system has stood the Treasury, making threatening passes and gestures and from time to time, cracking its whip. Whenever the Federal Reserve or its Open Market Committee, which carries out the purchases, has been reluctant to go along on this unlimited program of bond and security purchases, the Treasury has resorted to a strategy of mixed cajolery and threats.

"The reserve board has been told that it must cooperate, that it must stand by the President and not rock the boat. It has been told that if the price of government bonds falls or the interest rate rises, the reserve board will be held responsible. It is intimated that *if the reserve board is recalcitrant the reserve system will be nationalized and all independence will be taken away.*"

Obviously the controversy has raised the broad question as to the propriety of having the President bring pressure to bear on the independent Federal Reserve system. Apart from the matter of responsibility, and where it should lie, the question is raised as to the major premise in the President's memorandum: "That full confidence in the public credit of the United States requires stability in the government security market," when the latter statement means that there must be a scale of minimum price pegs acceptable to the Treasury and maintained by the Federal Reserve. The real question is, of course, whether it is true that U. S. bonds cannot be sold except in a rigged market, that buyers will not come forward, or would not come forward, if there is any risk of price decline. Rigging the markets has been generally frowned upon, and is officially contrary to public policy expressed in the Securities and Exchange Act. New bond issues are floated continuously by corporations, states and municipalities, and soon find their natural level. This is another phase of the operation of the law that underlies free enterprise. It is the effect of supply and demand. Yet the President of the United States implies that U. S. government bonds, the prime security of the world, must have artificial market supports for the life of the obligation so that the price is guaranteed. Also what the President demands is that we must install compulsion to buy bonds; first, upon the Federal Reserve bank, later, probably, other banks and other customers (*Turn to page* 146)

RESIDENTIAL AIR CONDITIONING

Section

Indoor comfort—in all seasons
for homes and small business

GAS
GAS
OIL
GAS
OIL
GAS
OIL
GAS
OIL
GAS
OIL
CENTURY'S
44 UNITS
Can make money
for you every day!
★ The dealer who sells from a complete line of Automatic Gas/Oil Heating Equipment closes more sales . . . makes more money!
★ Write Today! Some choice territories are open — let us tell you how you can build greater profits with an exclusive CENTURY franchise.
CENTURY ENGINEERING CORPORATION
CEDAR RAPIDS, IOWA
CENTURY
The Finest in Automatic Heating Equipment

Wisconsin Heating Code Sets High Standards For Schoolhouse Installations

Experience with the heating code in the state of Wisconsin has shown it to be beneficial to heating contractors. When bidding on a job they know their competitors must meet the same standards and price cutting is unlikely.

R. R. RIOPELLE*
ROGER OSTREM**

AN important transformation is taking place inside many an old schoolhouse today even though the structure itself, from casual observation, seems to remain unchanged. The internal changes spell convenience and health for teacher and pupils: Winter air conditioning and positive ventilation, completely automatic, are replacing the potbellied stove and the hand fired furnace. This change frequently leads to reduced operating costs. The savings often pay for the installation of modern toilet facilities to replace the interior dry closet vault.

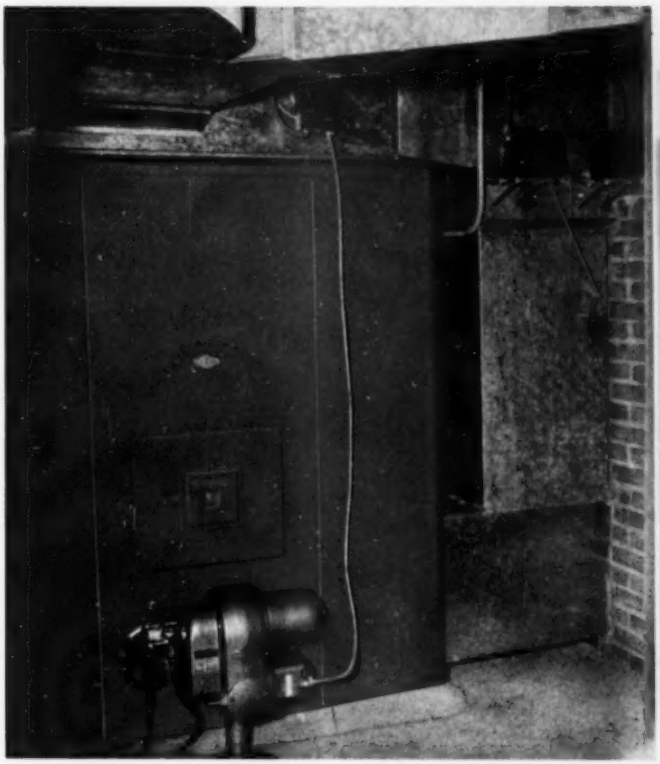
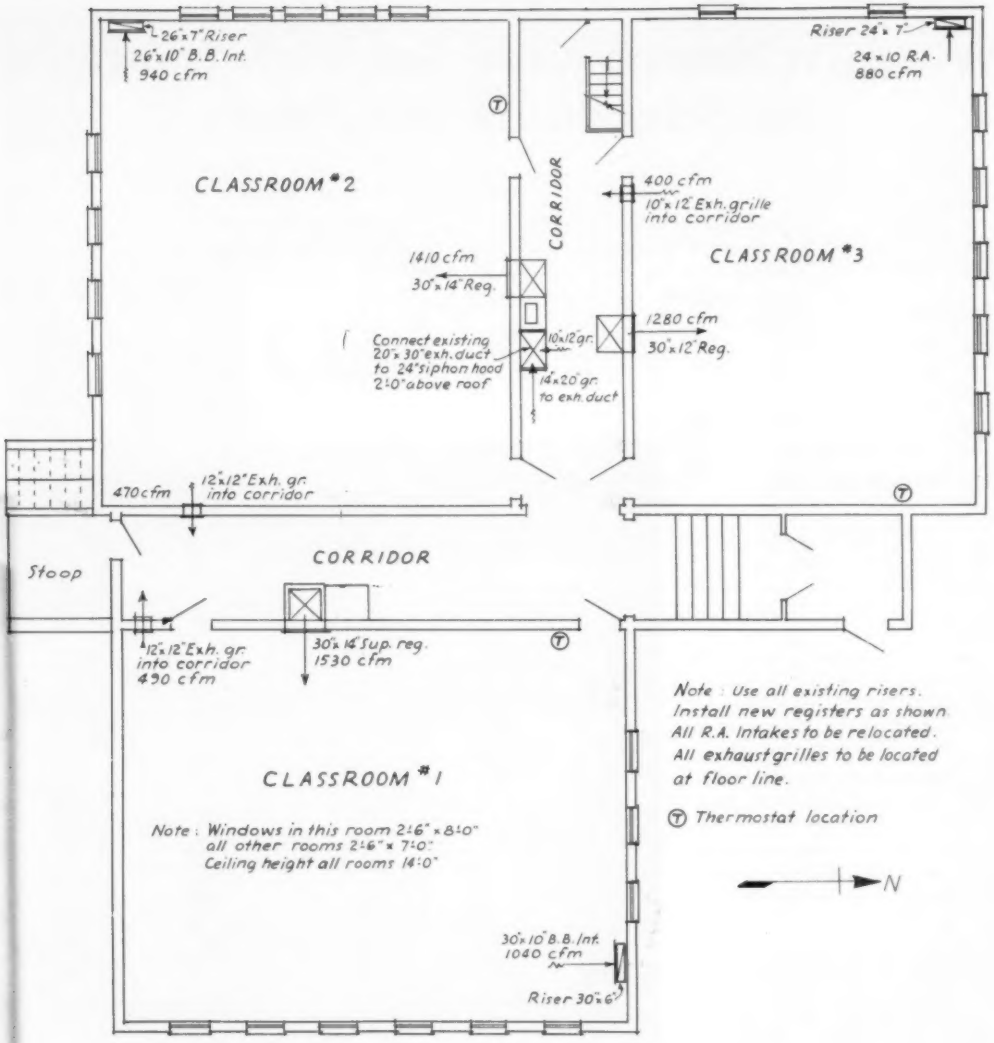


Fig. 1. Oil fired unit installed by H. F. Paulson Co. in the high school annex at Weyerhauser, Wis. Photo shows part of manifold assembly for three zone system of temperature control with continuous air circulation. Modulating damper motors are on vertical riser. Unit is 500,000 Btuh capacity firing rate 4.5 gph. Brick wall on right is fan room partition.

To the informed heating contractor, these changes can become an important source of business. Lack of information sometimes deters a contractor from seeking school heating jobs, especially where he must meet established standards specified by school agencies or, as in the state of Wisconsin, by the state heating, ventilation, and air conditioning code. The purpose of this article is to show how established standards obtain for the school better comfort conditions, and for the heating contractor fair competition and good business. It is hoped that the discussion that follows will enable the reader to seek school heating jobs designed to avoid the mistake of installing heating and ventilation systems which will not be approved

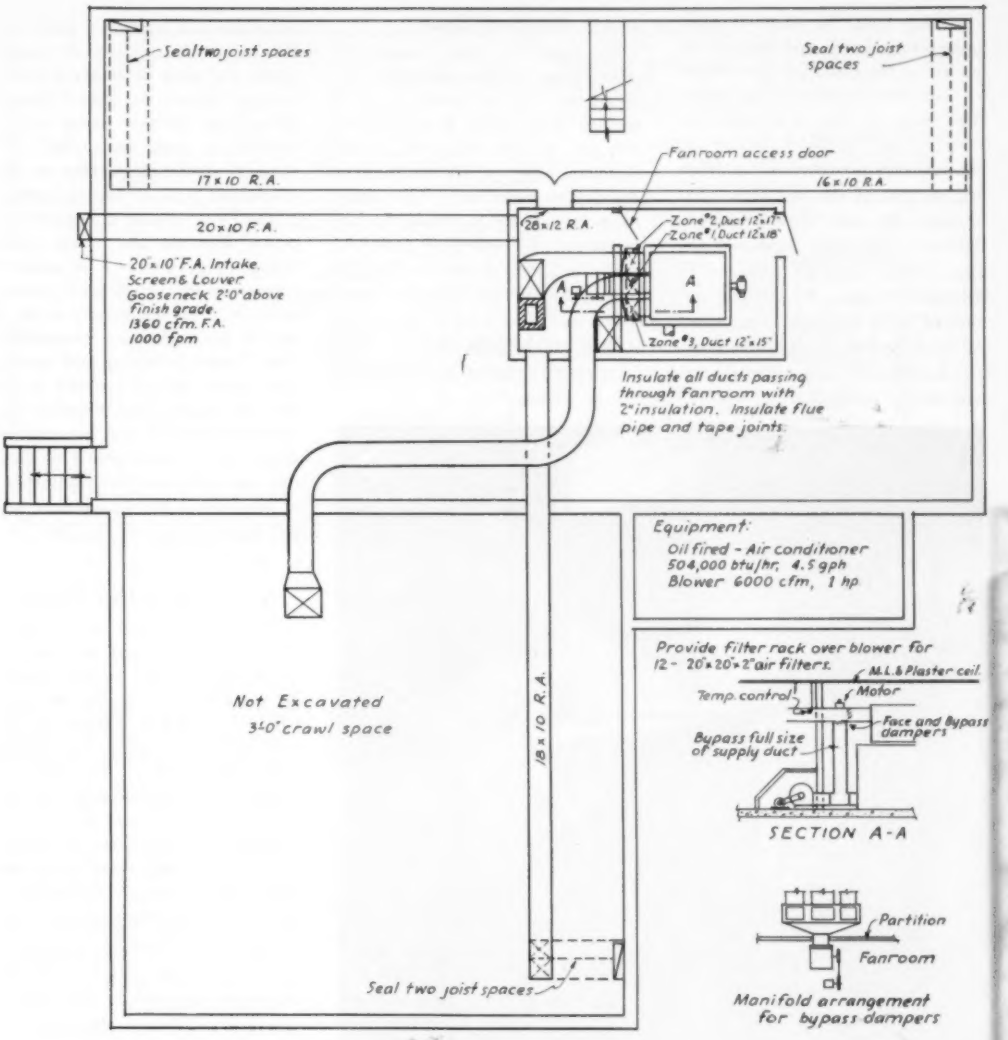
*Field engineer, Premier Furnace Co.
**Ass't building engineer, Wisconsin Industrial Commission.



where codes and standards must be met.

The standards of the Wisconsin code have the effect of law. They are not a set of rigid specifications nor do they cover the subject like a textbook. They apply to all buildings, with few exceptions, and apply to all types of heating. Because this article is written with smaller schools especially in mind, the discussion will incorporate these standards in considering warm air systems exclusively.

The code requires that a school heating system be designed to maintain classroom temperature of at least 70 F when the outside temperature is –14 F, –24 F, or –32 F, depending on the temperature zone of the state in which the building is located. Fresh air must be introduced into the distribution system, and vitiated air in an equal volume must be exhausted from the individual classrooms. Total air circulation required in a classroom is 30 cfm per person. This volume of air shall contain at least 10 cfm fresh air, permitting the remainder to be recirculated if the school has a chemical or water flush toilet system. The fresh air intake load must therefore be taken into account, together with construction heat losses, to determine capacities of furnace and blower. The temperature of air at the inlet register may not exceed 120 F.; air velocity at the register must be held to 500 fpm. In schools of 3 or more classrooms each room must be supplied continuously with air. Each


Seal two joist spaces
Seal two joist spaces
Fan room access door
17 x 10 R.A.
16 x 10 R.A.
20 x 10 F.A.
28 x 12 R.A.
Zone #2, Duct 12"x17"
Zone #1, Duct 12"x18"
20" x 10" F.A. Intake, Screen & Louver Gooseneck 2'-0" above finish grade. 1360 cfm. F.A. 1000 fpm
A
A
Zone #3, Duct 12"x15"
Insulate all ducts passing through Fan room with 2" insulation. Insulate flue pipe and tape joints.
Equipment:
Oil fired - Air conditioner
504,000 btu/hr, 4.5 gph
Blower 6000 cfm, 1 hp
Provide filter rack over blower for 12 - 20"x20"x2" air filters.
M.I. & Plaster ceil.
Motor
Temp. control
Face and Bypass dampers
Bypass full size of supply duct
SECTION A-A
Not Excavated
3'-0" crawl space
18 x 10 R.A.
Seal two joist spaces
Partition
Fan room
Manifold arrangement for bypass dampers

room must be provided with a thermostat to control the temperature of the constant air supply.

Before any installation work is commenced, plans, design data, and specifications must be approved by the state industrial commission.

Let us consider a few design problems which must be solved in order to obtain an approval for replacing an obsolescent school heating system. Let a typical classroom, for example, have an approximate floor area of 720 sq ft. The number of occupants on a computed basis of one person per 18 sq ft should be 40 persons. Total volume of air to be supplied is 30 cfm × 40, or 1,200 cfm. For 40 persons at 10 cfm each, fresh air requirement is 400 cfm, leaving 800 cfm to be recirculated. Vitiated air in a volume equal to the fresh air (400 cfm) is exhausted.

Fresh Air Load

Construction heat loss for the room is readily computed by most contractors, but the fresh air load computation is not always understood. It is, however, relatively simple. The fresh air volume, 400 cfm, is multiplied by the temperature differential for the zone, for example −24 F to +70 F, or 94 F, and the time — specific heat — weight factor, (60 minutes × .24 Btu × .075 lb), or 1.08. The result is 400 × 94 × 1.08 or 40,608 Btu per hour. By adding this load to the construction loss, the total heating requirement for the room has been determined.

Having found by similar computations the blower and furnace capacity for the entire job, the designer can now consider duct layout. The gauge of metal is stipulated by code for each width of duct as are the velocities permitted in the different sections of the ductwork. For instance, the main trunk velocity is held to 1,200 fpm, branches 750 fpm, vertical risers 500 fpm, and all returns 800 fpm. By dividing volume of air to be moved in each part of the ductwork by applicable velocity, the different cross sectional areas are readily determined.

Auxiliary Rooms

Standards for cloak rooms and toilet rooms are also outlined in the Wisconsin code. A movement of air through these rooms at a rate of 2 cfm per sq ft of floor area is the minimum accepted. It is customary practice to make use of the classroom exhaust air to obtain this air movement. By installing grilles in the lower panels of doors leading into corridors or into adjacent cloak rooms and toilet rooms, and by installing gravity vent flues in these rooms, the required air movement can be obtained.

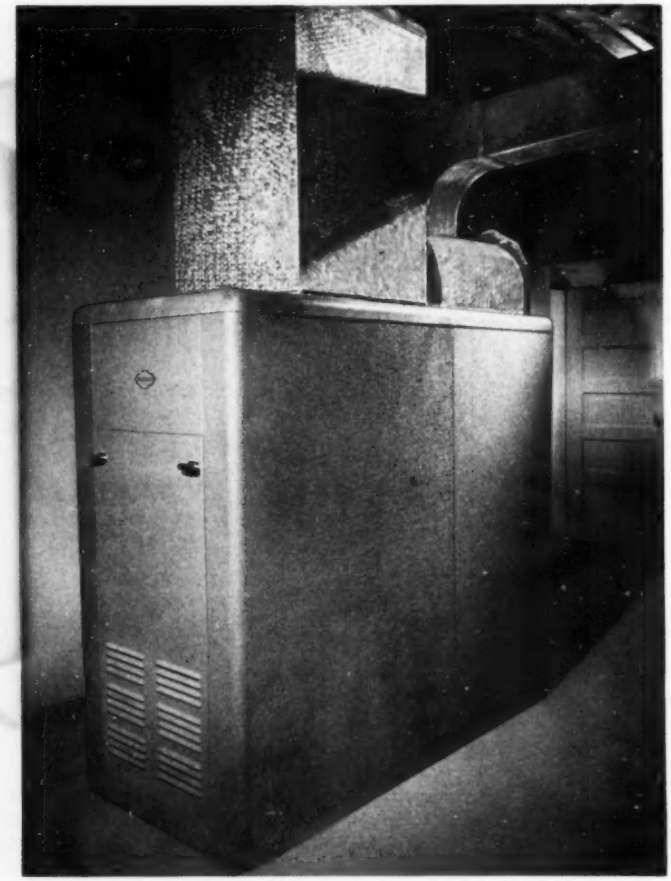


Fig. 2 Oil fired winter air conditioner installed by Paul's Sheet Metal in the Oak Grove School at Rice Lake, Wis. Walls of 8 in. masonry, and ceiling of metal lath and plaster comply with industrial commission requirements for a 2 hr. fire resistive heater room. Doors will be metal clad with fusible links. This unit is 137,000 Btuh capacity. There are many schools well within the range of equipment of this type.

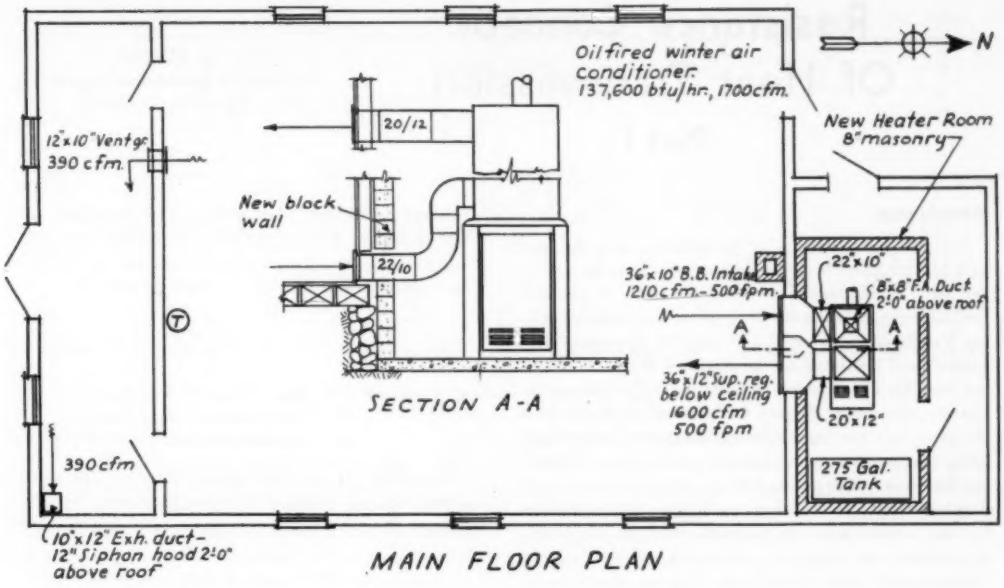
As discussed up to this point, the Wisconsin code applies to all schoolrooms and must be observed in designing systems for school houses having one or two rooms and a chemical or water flush toilet. Because of conditions peculiar to one obsolescent type of heating system, it may be of interest to consider the school with the dry closet vault. Schools with this type of sanitary system present the informed contractor with a real opportunity to be of service to the school community. Here a modern heating and ventilation system can be installed to replace the existing system and by the savings effected in fuel consumption alone, over a short period of time, pay not only for the replacement of the system but in addition pay for modernizing the wasteful dry closet vault.

Non-Recirculation Costly

The dry closet vault still exists in many old schools and must be frequently burned out. In warm weather, a stack heater in the flue must be fired to induce exhaust of the foul air. No air can be recirculated within the building. The fuel consumed to heat the building with 100 per cent fresh air and all of it exhausted is a heavy drain on the taxpayers. Show the school board that still tolerates these conditions a modern plan for recirculating most of the air, yet providing good air in all rooms, in accordance with the standards discussed in this article, and you will have developed an enthusiastic prospect.

Larger Buildings

School buildings having three or more classrooms are in a special category. Without proper controls, one of the several rooms will certainly become overheated while at the same time another room will be underheated. Automatic controls are therefore mandatory in the multi-classroom school in Wisconsin. Each classroom must have a thermostat to control the temperature of the continuous air supply. Here the unini-



tiated contractor may throw up his hands for fear of complexities beyond his experience and personal capacity. He will soon be reassured if he will consult with control manufacturers who are eager to come to his assistance.

The warm air system for a multi-classroom school under continuous blower operation consists essentially of a furnace and blower with a by-pass duct system. Fresh air and recirculated air are passed through the filters to the blower. From the blower air passes through the furnace and through the bypass. Warm air and bypassed air are joined at the duct leading to a classroom. At this junction an automatic mixing damper is located, the motor for which is controlled by the room thermostat. There are different methods of designing the bypass system, but the same results must be obtained, i.e. continuous delivery of air under close temperature control.

Sequence of operation of the different schemes are essentially similar and function as follows:

On a signal for heat from any room thermostat, the damper motor operates to supply more warm air and less tempered air. When the thermostat approaches satisfaction, the damper motor reverses, or, operated by a remote bulb thermostat located in the discharge duct connected in series with the damper motor, modulates the supply. Warm air and tempered air dampers are connected by a common linkage and a full and constant supply of air is obtained.

Controls

Some systems incorporate a control for maintaining constant temperature in the furnace bonnet regulated by an outdoor thermostat. Some incorporate clock controls for lower night settings. The refinements of control although not mandatory beyond meeting minimum code requirements are a matter for the discerning contractor to establish.

The replacement of obsolescent school heating systems can be a challenge and it can be a source of satisfaction and profitable business. The little red schoolhouse needs modernization; the standards for heating and ventilation should be high. Experience with the standards in Wisconsin has been successful. Contractors bidding for public heating systems have some assurance under it that competitors are quoting prices on systems of equal performance and capacity, resulting in good heating, good ventilation, and good business.

Fig. 3 Closeup of the manifold assembly showing the individual by-pass duct arrangement for each zone. Manifold feeder assembly is located in fan room proper.

Resistance Concept Of Heat Transmission

Part I

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Introduction

Accurate determination of the heat loss and the heat gain of a structure is the foundation on which the science and art of heating and air conditioning rests. A practical method for calculating the design heat loss from a building is outlined in manual No. 3, entitled Measuring Heat Losses* and published by the National Warm Air Heating and Air Conditioning Association. The manual illustrates the use of factors for a range of design temperatures and the use of area measurements for calculating heat losses through common combinations of building materials. The purpose of this series is to present a simple concept of heat flow so coefficients of transmission for any combination of materials may be accurately determined. An analogy to elementary laws of electrical resistance will assist in understanding the principles by which the flow of heat through building materials is retarded.

The basic unit of heat flow in the heating and air conditioning field is termed U value, or the overall coefficient of heat transmission. Values for U are expressed in Btu (per hour, square foot, degree F air to air temperature difference) that will be transmitted from air on one side of a building element to air on the other side.

Many heating contractors find it difficult to calculate U values for various material combinations even when the conductivities and conductances of the components are given. Part of the difficulty arises from the fact that conductivities or conductances cannot be added. Furthermore, it is not generally realized that surface temperatures of any wall under any temperature condition can be estimated, and that it is even possible to predict when condensation will occur on inner surfaces.

Since the greatest difficulty exists in understanding the nature of surface film and air space resistances, a considerable portion of this series will be devoted to available data for constructions involving both reflective and non-reflective materials. The author has attempted to summarize the data in simple diagrammatic form as far as possible.

Much of the material presented in this series may be considered as a supplement to the information contained in manual No. 3.

Electrical Analogy of Resistance

Students learn in high school physics a simple law governing the flow of electric current. It is commonly referred to as Ohm's law and may be expressed: The rate of current flow equals the electromotive force (voltage drop across a resistance) divided by the resistance. In equation form the law is stated as follows:

$$I = \frac{E}{R} \qquad (1)$$

where I = rate of current flow, amperes
E = electromotive force, volts
R = resistance, ohms

Example: If an electromotive force of 110 volts is passed through a coil of 10 ohms resistance, the rate of current flow will be:

$$I = \frac{110}{10} = 11 \text{ amperes.}$$

This is shown in Fig. 1a. It may be assumed that the hot side, E_1, is 110 volts and the ground side, E_0, 0 volts. The lower diagram in Fig. 1a indicates the voltage drop along the uniformly wound coil, the total drop from E_1 to E_0 being 110 volts.

Now assume that the coil is cut in half, but the same force is again applied, as shown in Fig. 1b. Since only half the coil is used, the resistance has been reduced to 5 ohms. From equation (1) it will be found that the rate of current flow has increased to 22 amperes, or twice the amount in the first example. The lower diagram in Fig. 1b shows the rate of voltage drop which is more rapid than that in Fig. 1a. The total drop is exactly the same as that in the previous example.

The third variation is shown in Fig. 1c in which three resistances are connected in series so the current flows through each coil. Resistance R_i is rated at 10 ohms, R_c at 10 ohms, and R_o at 2 ohms. The sum of the three resistances is 22 ohms. Again the same force of 110 volts is applied and from equation (1) it will be found that the rate of current flow has decreased to 5 amperes. Note that the current has diminished considerably from the higher resistance. Furthermore, it can be observed that the voltage drop across each of the three coils in series is related to the resistance of each coil. That is, the voltage drop across resistance R_i is equal to 10/22 of 110, or 50 volts. Similarly, the drop across R_c is also 10/22, or 50 volts, and that for R_o is 2/22 of 110, or 10 volts. The three distinct steps in voltage drop are shown in the lower diagram of Fig. 1c. It will be observed that when the resistance is large, the voltage drop across the resistance is also large.

*S. Konzo and G. A. Voorhees

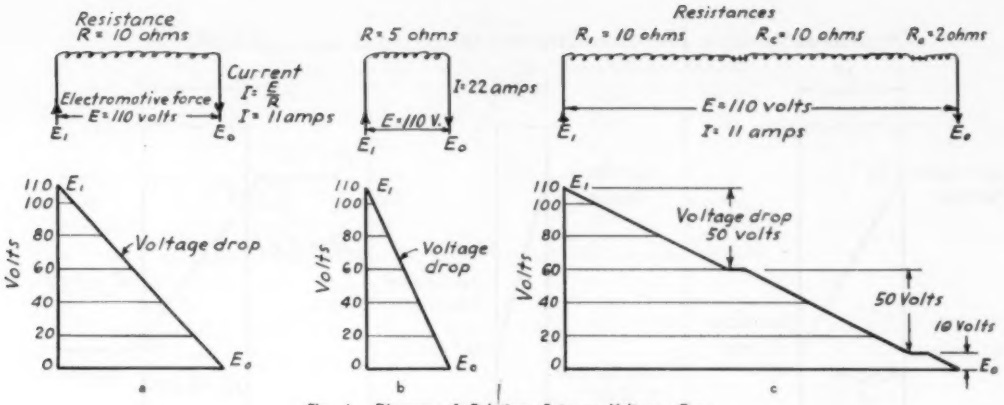


Fig. 1. Diagram of Relations Between Voltage, Current Flow, and Resistance in Simple Electrical Circuit.

Thermal Resistance to Heat Flow

At first glance the preceding electrical analogy seems to have little bearing on the subject of heat flow. It will be shown however, that the flow of electric current is similar to heat flow, that temperature drop is similar to voltage drop, and that electrical resistance is similar to heat resistance. This statement can be proved by further analysis.

The commonly accepted equation for heat transfer through building materials is:

$$H = A(td)U$$

where H = heat transmission, Btu per hour
A = surface area, square feet
td = temperature difference between air on one side of a wall to air on the other side, degrees F
U = overall coefficient of heat transmission, Btu per hour, square foot, degree F.

If A is unity (one sq ft), then equation (2) reduces to:

$$h = (td)U \qquad (3)$$

The lower case h indicates the heat transmission though only one square foot of surface is being considered.

Since the rate of heat flow is inversely proportional to the resistance; that is, when the overall coefficient of heat transfer is large the resistance is small and vice versa, then U is the reciprocal of the resistance:

$$U = \frac{1}{R} \qquad (4)$$

where R = thermal resistance, in suitable units.

In equation (3), U may be replaced by its new value $1/R$:

$$h = \frac{td}{R} \qquad (5)$$

By comparing the terms in this equation with those in equation (1) for electric flow, it will be seen that there is an exact analogy. Heat flow, h, can be compared with the rate of current flow, I; temperature difference, td, with the force which causes electric flow, E; and thermal resistance, R, with electrical resistance, R.

Examples of Thermal Resistances

While it has taken considerable explanation to draw this analogy, once it is understood, problems of heat flow will become easier to solve. Three simple examples will help to clarify the similarity.

Assume that the surface temperature on one side of a 1 in. insulating board, shown in Fig. 2a, is 70 F and 0 F on the other. Note that these are surface temperatures and not the air surrounding the board. At present there need be no concern about how these temperatures were obtained and it will be assumed that they can be maintained.

The arbitrarily assigned value of resistance is 4.0 units. Also, it is not necessary at this time to know what the units of resistance are called; hence, they shall be referred to merely as resistance units. By applying equation (5) and solving, the rate of heat flow through the board is:

$$h = \frac{(70-0)}{4.0} = 17.5 \text{ Btu per hour}$$

Suppose the thickness of the board is reduced to ½ in. Thin material has less resistance to heat flow than thick material of the same composition. In this case, since the new thickness is half the original, the resistance also will be exactly half of its original value, or 2 units. If we assume that the surface temperatures on the two sides of the insulating board remain 70 F and 0 F, the rate of heat flow becomes:

$$h = \frac{(70-0)}{2.0} = 35 \text{ Btu per hour}$$

Comparison of both boards, Figs. 2a and 2b, shows that the slope of the curve for the temperature drop through the thin material is much steeper than that for the other, despite the fact that the temperature difference is 70 F in both cases. The slope of the temperature drop through a material is a rough measure of its thermal resistance. A material of high resistance will show

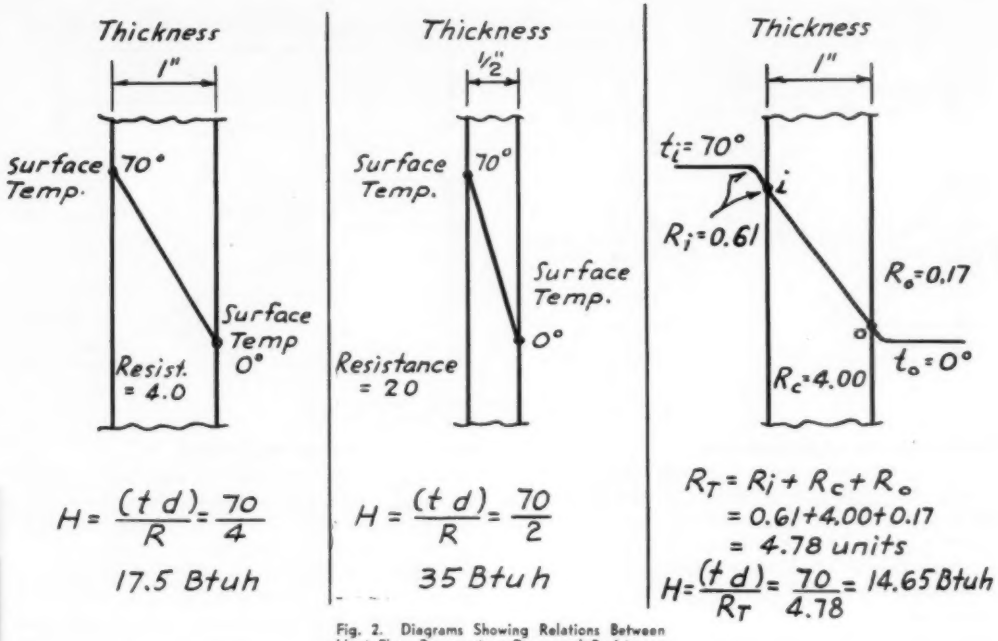


Fig. 2. Diagrams Showing Relations Between Heat Flow, Temperature Drop, and Resistance.

a relatively flat temperature drop, while a low resistance material will show a steep slope.

Resistances In Series

In practically all cases, resistance to heat flow is made up of a number of materials in series. An example is shown in Fig. 2c where three resistances, R_i, R_c, and R_o, are in series. This example is similar to the one shown in Fig 1c and is handled in the same manner. If we assume that:

resistance R_i is .61 units, R_c 4.00 units, and R_o .17 units, the total resistance is 4.78 units. The rate of heat flow at a temperature difference of 70 F becomes:

$$h = \frac{70}{4.78} = 14.65 \text{ Btu per hour}$$

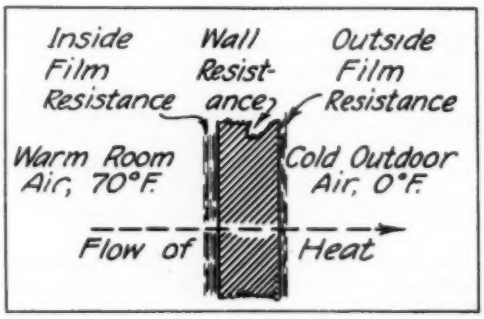


Fig. 2d. Inside and Outside Film Resistances. (From Manual 3)

Surface Film Resistances for Non-Reflective Materials

A study of Figs. 2a and 2c shows a significant difference. In Fig. 2a the assumption was made that the surface temperatures on the two sides of one inch material were 70 F and 0 F. However, in Fig. 2c 70 F represents inside air temperature and 0 F outside air temperature. Note that the inside surface temperature will be higher than 0 F. Resistances R_i and R_o are called film resistances and refer to the thin layer of air at the surface through which the heat must flow, as shown in Fig. 2d. These film resistances must be included whenever the required rate of heat flow is from air on one side to air on the other as it is in most cases of building construction. The values commonly used for inside film resistance, R_i, is .61 units, and for outside film resistance, R_o, is .17 units. The latter value is for a surface exposed to a wind velocity of 15 miles per hour.

It may be noted that the effect of having a 15 miles per hour wind blowing on the surface is to reduce the resistance value, which is equivalent to saying that the flow of heat is increased when the wind velocity is increased. Normally, heating engineers use the values of .61 and .17 for R_i and R_o without any further thought. Occasionally, however, the need arises for more detailed explanation of the factors affecting the film resistance. The values in Table 1, which were derived from data of Rowley, Algren, and Blackshaw (ASHVE *Trans.* v 36,

Table 1
SURFACE FILM RESISTANCES FOR NON-REFLECTIVE MATERIALS.

	Velocity of Air Over Surface (Parallel to surface)						
Mph	0	5	10	15	20	25	30
Fpm	0	440	880	1320	1760	2200	2640
Glass	0.67	0.36	0.25	0.19	0.16	0.14	0.12
Smooth Plaster	0.55	0.33	0.24	0.18	0.15	0.13	0.11
Brick	0.53	0.27	0.19	0.14	0.11	0.09	0.08
Stucco	0.51	0.23	0.15	0.11	0.09	0.07	0.06

Note: Working values of surface film resistances for non-reflective materials are:
0.61 for still air
0.17 for 15 miles per hour wind velocity
(Data condensed from work of Rowley, Algren and Blackshaw, ASHVE *Trans.* v. 36, 1930, p. 444) Data shown were for tests conducted with a mean temperature of 20 deg. F.)

1930, p. 444) show that the surface film resistances depend to some extent upon the smoothness of the surface and to a larger extent upon the air velocity over the surface. For example, a smooth glass surface shows a rapid decrease in film resistance as wind velocity increases from 0 to 15 miles per hour, but a slower rate of decrease for velocities higher than 15 miles per hour.

The values in Table 1 show also that the film resistances are less for rougher surfaces. Note that the values for a stucco surface are smaller than those for smooth plaster or glass. We can expect therefore that for a given difference in temperature between air and surface, heat flow through the stucco film will be larger than that through the glass film. The fact that the film resistance for glass is decreased from .67 to .12, or roughly one fifth of its values, when wind velocity is increased, does not mean that the total heat flow through a window is increased in the same proportion. It can be shown from Fig. 2c that the total heat flow depends upon the total resistance. Changing only one resistance and not the others will affect the total resistance to only a degree.

The question frequenty arises whether an increase in design heat loss should be allowed when a given structure is exposed to a prevailing wind that greatly exceeds 15 miles per hour. The data in Table 1 can be used to analyze the possible effect of such wind velocities.

Example: If the typical residence considered on page 171 in *Winter Air Conditioning** is used as a basis of the calculations, the following increases in the heat loss result from the increase in design wind velocity from 15 miles per hour to 30 miles per hour:

Item	*U* at 15 mph	Heat Loss	*U* at 30 mph	Loss
Roof loss	0.29	16,200	0.30	16,800
Wall loss	0.245	27,000	0.25	27,500
Glass loss	1.13	25,800	1.21	27,600
Door loss	1.13	4,300	1.21	4,600
Floor loss	0.34	2,100	0.34	2,100
Infiltration	39.3	24,600	104.0	64,300
Total		100,000 Btu		142,900 Btu

*S. Konzo

It is assumed that an increase in wind velocity will not affect the floor loss. Both the glass and door losses are increased considerably more than the wall or roof losses, since the total resistances for glass and door losses were small. That is, the change in outside film resistance will have relatively greater effect on that portion of the structure which is a good heat transmitter. Actually, the change in the surface film coefficients did not appreciably affect the losses in the first items. The main effect of the increase in wind was to increase the infiltration loss from 24,600 to 64,300 Btu per hour. The overall increase in heat loss due to wind was about 42.9 per cent. The values given apply only to this structure, but the method of solution would apply to any structure.

Surface Film Resistances for Reflective Surfaces

The value of 0.61 for R_i is for materials defined as non-reflective and applies to practically all materials commonly used in building construction. In order to present the complete picture, however, it is necessary to indicate the exceptional type. A material such as aluminum foil is designated as reflective because it will reflect 95 per cent of the heat radiation to which it is exposed. This is in contrast to non-reflective surfaces, such as wood, plaster, building board, gypsum lath, fiber insulation, paper, etc. which reflect only about 17 per cent of the radiation to which they are exposed. These materials will absorb the remaining 83 per cent with a subsequent rise in temperature. Since heat transfer takes place not only by conduction and convection but also by radiation from surfaces, the total heat received by an aluminum coated surface will be less than that received by non-reflective surfaces. Therefore the surface film resistance will be greater for a reflective surface than one that is non-reflective.

Proof of this statement is shown in Fig. 3 which lists the values obtained by Wilkes and Peterson (ASHVE *Trans.* v. 44, 1939, p. 518) for both types of surfaces. The arrows indicate the direction of heat flow and the shaded lines labeled *film* designate the surface from which heat transfer is occurring. For example, the top left diagram shows a surface film resistance of 0.51 units

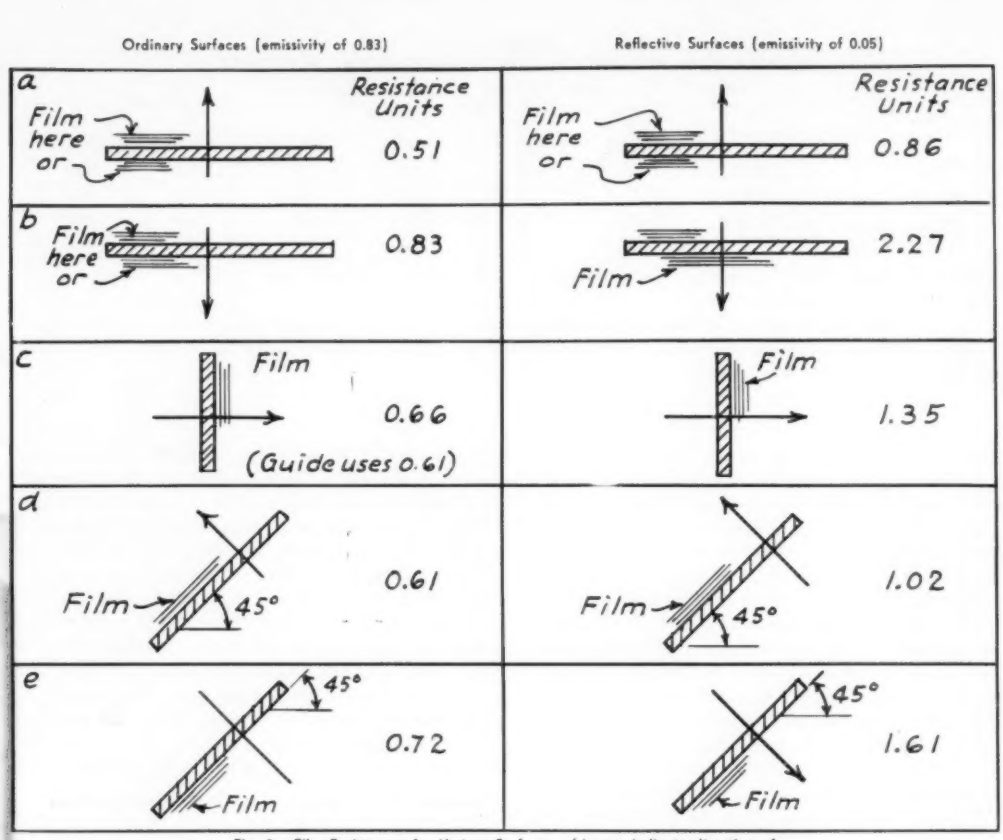


Fig. 3. Film Resistances for Various Surfaces. (Arrows indicate direction of heat flow.) Data from Wilkes and Peterson, ASHVE *Trans.* v. 44, 1938, p. 518.

when the flow is upwards from an ordinary surface, such as the upper surface of a floor of insulation board in an attic.

The right hand diagram shows that if the surface were aluminum foil or other brightly polished metal surface, the film resistance would be 0.86 units or almost 70 per cent better than ordinary surfaces. The film resistance of less reflective material, such as galvanized steel or tin, would lie somewhere between the values of 0.51 and 0.86. The fact that reflective metal surfaces have high film resistances serves to expain why heat transfer from a galvanized or tin duct is less than one covered with a thin layer of asbestos paper.

Some interesting observations can be made from the illustrations in Fig. 3:

a) The film resistances for a highly reflective surface, such as aluminum, are substantially higher than those for ordinary surfaces. This applies to all three positions of the surfaces illustrated and to both directions of heat flow.

b) When heat flow is downward, the film resistance for the reflective surface is more than twice as great as that for ordinary surfaces. This indicates that a layer of aluminum foil placed below the rafters of an attic space will be relatively more effective in keeping out summer heat than in preventing heat loss in winter.

c) The resistance of a non-reflective surface of a vertical wall is given by Wilkes and Peterson as 0.66 which is slightly higher than the 0.61 value assigned in this discussion. However, the two are sufficiently close so the ASHVE *Guide* value of 0.61 will be retained in later references.

d) If the walls and ceiling surfaces of a room were faced with a highly reflective material similar to the construction of a thermos bottle, it would be possible to reduce heat flow through the walls and ceilings to some extent. Such a residence has been constructed in Cincinnati by Dr. C. Mills, although the primary purpose in this case was to reduce the radiation loss from the human body to the walls and ceilings and thereby obtain comfort conditions with lower air temperatures.

The values given in Fig. 3 apply only to still air near the surface. If air motion exists over the surfaces, the resistance values would be sharply reduced. No experimental data are available for wind effects on reflective film resistances.

Warm Air Perimeter Heating Improves With Additional Installations

ROGERS FOLLANSBEE
President
Mechanical Home Systems, Inc.

IN two previous articles (AMERICAN ARTISAN, November and December 1950) the author outlined the theory of perimeter warm air heating and presented suggested layouts for popular types of residential construction. This article is the first of several on engineering this type of heating system.

Early Installations

Kimball Hill, a builder in the Chicago area, was one of the first to install perimeter warm air heating in a large home building development. These houses were built on concrete slabs and though an outmoded two loop distribution system was installed, results are superior to those obtained from any other method in this type of house construction. In fact, it might be mentioned that it was Hill's Park Ridge Manor project which brought recognition to the perimeter theory of warm air heating which has become so popular recently.

Change in Design

Figs. 1 and 2 respectively show the layout of the system installed and as it would be installed today. It will be observed that the trunk and branch in Fig. 1

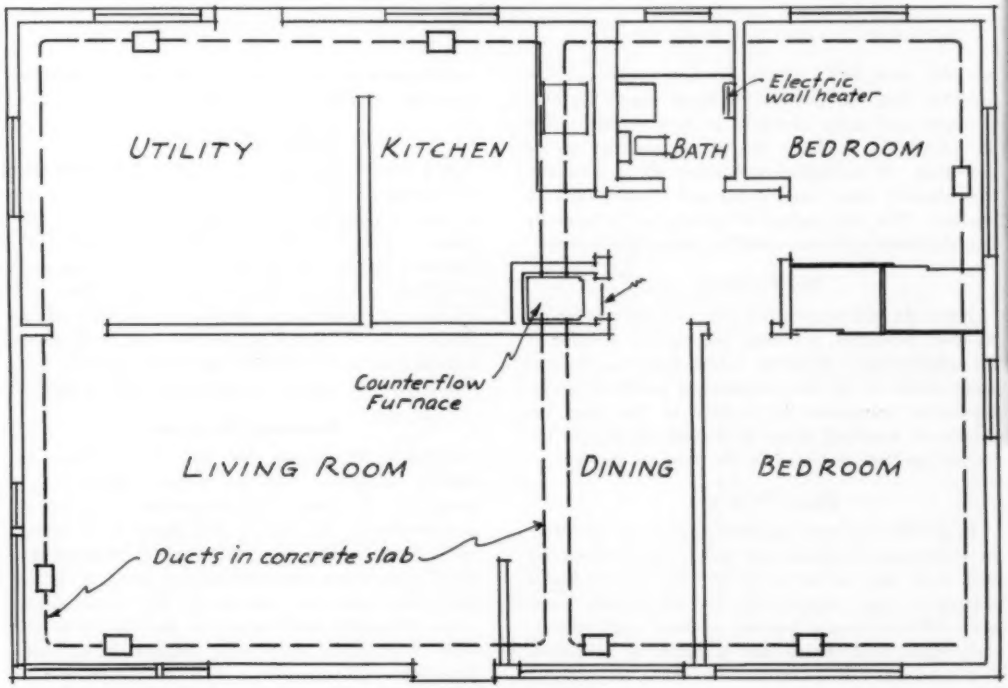


Fig. 1. Early type of installation

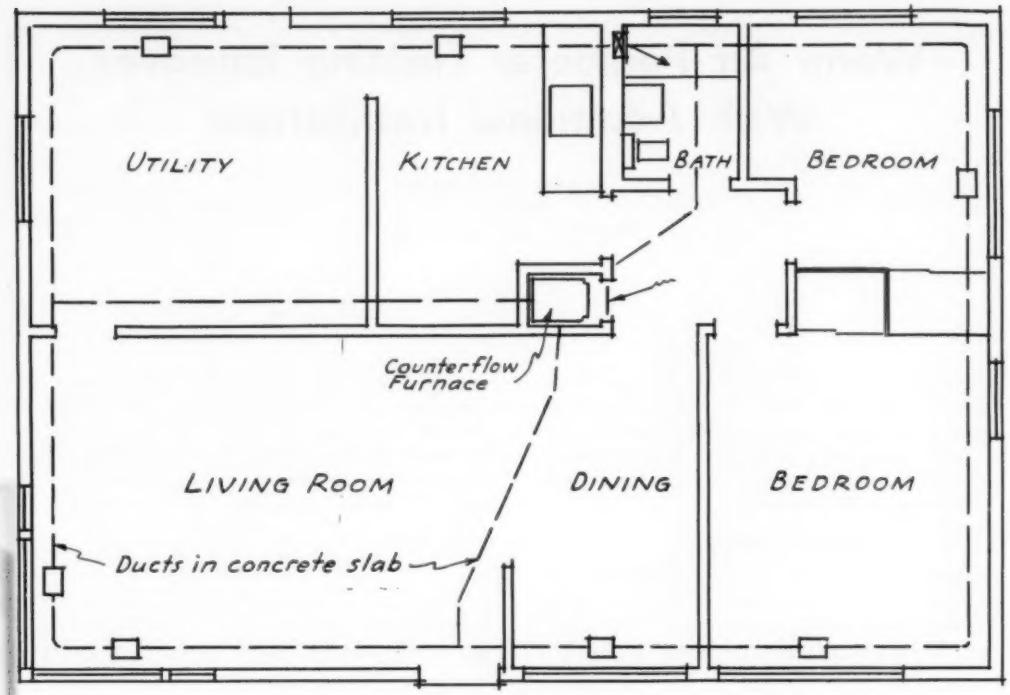


Fig. 2. Improved perimeter system.

are the same duct. Obviously, this method of distribution does not provide for equal supply air temperatures and static pressures at each register. The layout in Fig. 2 shows the continuous duct at the perimeter. It is supplied with warm air in a manner that provides equal temperatures and pressures at each register. The first method of distribution is basically out of balance while the second is basically in balance.

The Problem

When Mr. Hill decided last year to build a home for his own occupancy, perimeter heating was included in the specifications. However, before describing the system installed in his new residence. it would be advantageous to re-examine the problem so that when the solution is presented, it can be decided whether the objective has been achieved in the simplest manner.

Basic Principle

To provide maximum heating comfort in any structure it is necessary to replace heat that is lost, at the point that it is lost, as fast as it is lost. In residential applications this usually calls for air delivery from floor diffusers located beneath windows with substantially equal temperatures and pressures at all points. If a house has a basement or crawl space, conventional distribution such as an extended plenum or trunkline systems meet the requirements. But a house constructed on a slab requires special consideration.

Radial Distribution

If a basementless house is small, radial distribution will be successful, Fig. 3, whether it is built on a slab or over a crawl space. A large structure on a slab, however, requires continuous loop distribution. The reason is simply that the latter has more windows to be blanketed with air than a small one. Thus, it is necessary to extend the plenum to the edge of the structure so all principal windows can be blanketed without making an excessive number of separate ducts direct from the furnace to each individual register.

Balanced Pressures

Following this theory, Mr. Hill, H. A. Ziehm, his heating contractor; and the author collaborated in designing a continuous loop distribution system for the new residence. The key to this design is in routing feeder ducts so all parts of the loop will be at virtually equal temperatures and pressures. A study of the layout in Fig. 4 indicates that this has been accomplished.

An interesting observation on this layout is that while 8 in. round ducts were installed, 6 in. would have been ample or superior. This substitution occurred because the smaller size ducts were not available.

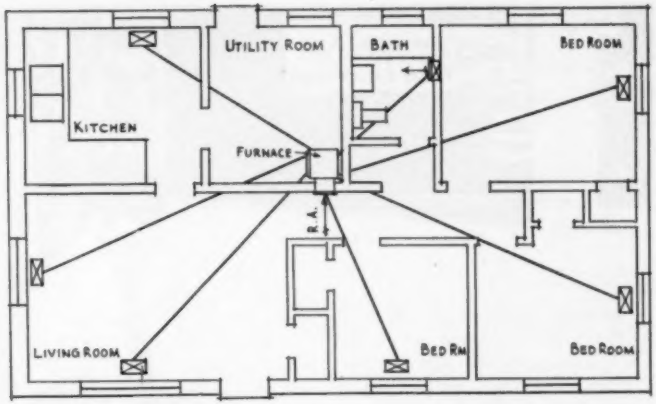


Fig. 3. Small basementless house with slab floor. Radial distribution system. Counter-flow furnace.

Limitations

Basic rules of design should be used in designing a continuous loop system. Temperature rise through the furnace should not exceed 100 F and velocities in trunk and feeder ducts should not exceed 700 fpm. Under these conditions, the capacity of an 8 in. round duct approximates 25,000 Btu, and that of a 6 in., 14,000 Btu. Since the calculated heat loss of the Hill residence approximates 80,000 Btu, it is evident that the area of the feeder ducts is almost twice the requirements. Despite some sluggishness in the feeders, the system has been adjusted for continuous air circulation and has worked out extremely well.

Fine Performance

According to the owners, the system has been "just right" even during the unusually cold weather which has prevailed in the Chicago area this past winter. This performance is confirmed by recent tests which show substantially equal temperatures and pressures at each register, good temperature balance between the rooms, and no floor to ceiling temperature gradients exceeding 4 F. In addition the floor is warm — but not hot!

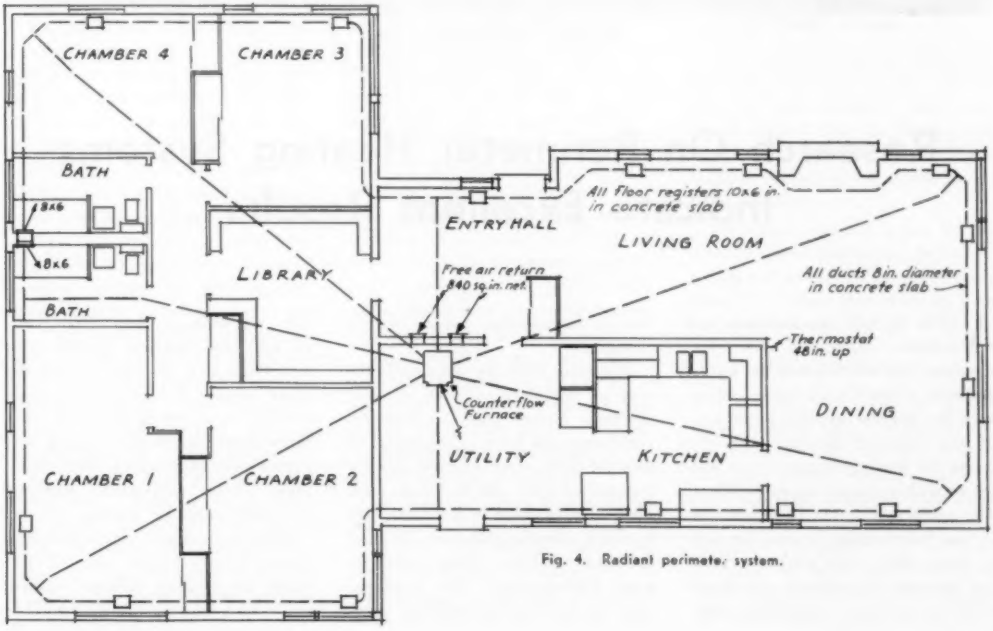


Fig. 4. Radiant perimeter system.

Investigator Brill records test results.

Research On Perimeter Heating Systems Indicate Excellent Results

A FEW YEARS ago architects and builders introduced the basementless type of house in the northern area of the United States. Along with the introduction and popularity of this type of dwelling unit the warm air heating industry was presented with a serious design problem. The problem was not so much how to heat basementless houses, but how to make them comfortable. Since our industry is primarily concerned with *Indoor Comfort* providing comfort in basementless houses became paramount.

The main difficulty standing in the way of complete comfort in basementless houses built on concrete slabs was cold floors. Regardless of how the floors were insulated and vaporproofed they still lost too much heat. The question then became how to secure a comfortable floor. In good American fashion many opinions were forthcoming. The commonsense answer to this problem, however, was to supply heat where greatest heat loss occurred. According to tests this was in the slab, around the outer edges. A number of suggestions of how best to introduce heat in the concrete slab were offered, and a good many ideas were actually tried. From these suggestions emerged perimeter warm air heating.

What was originally regarded as a hazard to the advancement of the warm air heating industry turned out to be a blessing in disguise. This

trend in home construction started a series of developments that has changed some concepts of warm air heating. There are many who claim that perimeter heating, which includes counterflow furnaces and warm air registers near the outer walls, is actually the second industrial revolution our industry has experienced. The first, of course, was the development of winter air conditioning.

Research has always been the principal stock in trade of the National Warm Air Heating and Air Conditioning Association. Recent rapid developments in the field of warm air perimeter heating have made it necessary to carry the research to the field where the systems are installed.

Perimeter Heating Studied in Research Residence

During 1949 the National Warm Air Heating and Air Conditioning Association decided to build a third research residence at the University of Illinois, for the primary purpose of checking and testing the two-loop system for perimeter warm air heating. Much was learned during the 1949-1950 heating season from work done in research residence No. 3. At the same time members of the association's newly formed field investigating committee were conducting a series of investigations of heating systems installed and operating in many homes throughout the country. As a direct result of this work the first industry-accepted, recommended design and installation manual was published. This manual, No. 4, has received wide circulation, not only among heating men but also architects and builders during the year it has been available to the industry.

While the association was checking the two-loop system, other developments were taking place. A number of alert heating engineers and contractors were meeting the problem of comfort heating for concrete slab floors in many different ways. Experimental heating systems increased rapidly. In many cases these systems were outperforming even the high expectations of the experimenters. It was felt that many of these systems deserved further testing.

To bring all these systems to the University of Illinois for checking and testing would be quite impossible. Therefore, the association decided to augment formal research activities by sending its research to the heating system.

To accomplish this the national association placed in operation during the 1950-1951 heating season a completely equipped mobile laboratory for the purpose of testing newer types of warm air heating systems which are being installed in homes across the nation.

Well-Equipped

The mobile test laboratory is transported in a 1950 Chevrolet sedan-delivery car. Over 400 lbs. of the latest in temperature, air velocity and air humidity recording apparatus make up the research tools of the laboratory. Included in this apparatus are: 8 point continuous temperature recording devices, 24 point selective temperature meters, hundreds of thermocouples and hundreds of feet of connecting wire. The objective is to record a complete temperature pattern within the entire house, at the floor level, at the sitting level – 30 in. above the floor – and at the ceiling level. Humidity readings are also made regularly as are air velocity checks. A constant record of the prevailing outside temperature is maintained against which the inside temperature pattern can be plotted and the rapidity with which the system reacts to outside temperature changes noted.

The same thorough testing procedure is followed in the field as in the university testing program, so that results from each activity can be cross-checked and evaluated in the light of findings of the other.

Project engineer in charge of the mobile test laboratory is James H. Brill, research associate with the warm air heating research staff at the University of Illinois. The scheduling of field testing projects and the operation of the mobile unit is under the direction of the field investigation committee.

Whereas the primary objective of the mobile laboratory is to test new and promising types of warm air heating systems, a secondary objective — particularly applicable during the present emergency period — is the testing of the use of materials other than those traditionally used in the installation of systems. Galvanized sheet steel, most often used in warm air distribution systems, is in short supply and gives every indication of becoming scarcer. Aluminum sheets are in much the same situation. Hence, tests will be made on systems using non-metallic ducts such as clay pipe, tile, concrete duct, etc.

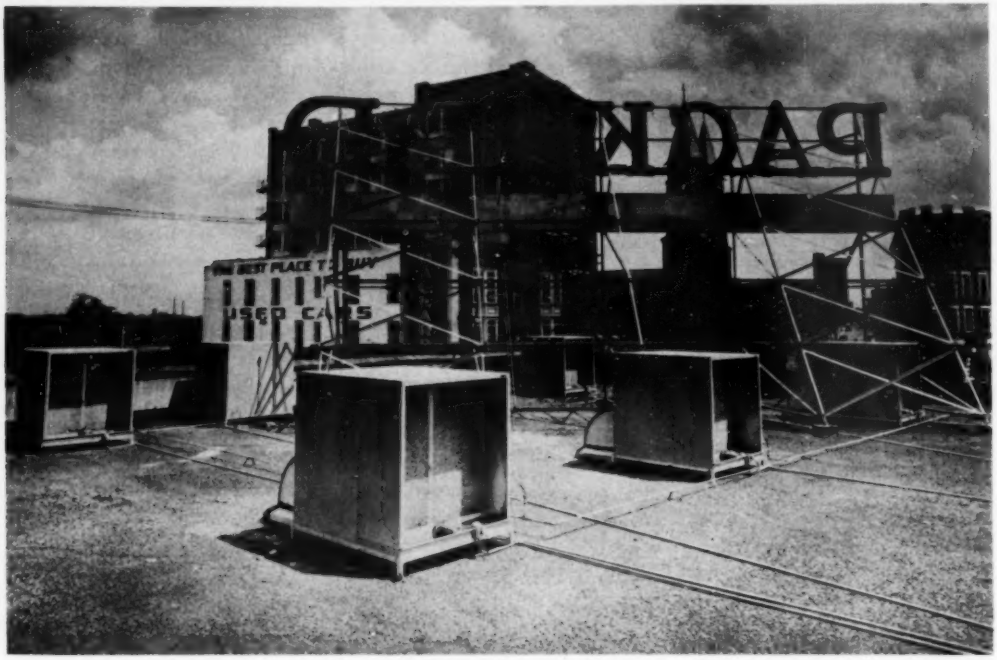
Crawl Spaces

Also scheduled is the testing of crawl space houses in which practically no ducts are used. The warm air is dumped into the crawl space itself and permitted to enter the house through register openings beneath windows.

The above are just a few of the newer systems which are being installed and on which the association desires to obtain true research data for the industry's benefit.

Time Shortened

It is anticipated that the mobile home heating test laboratory will achieve in two years the equivalent of ten years' formal research. The results obtained, analyzed, and translated into published design and installation information will eventually result in even greater comfort-producing, economical, and efficient warm air heating systems.



All units are shown in this view.

Evaporative Cooling Units Find Popularity In Southeastern States

B. P. EDELMAN*

Recent successful applications of evaporative cooling in Georgia have pointed the way to the opening of a market not previously considered fruitful.

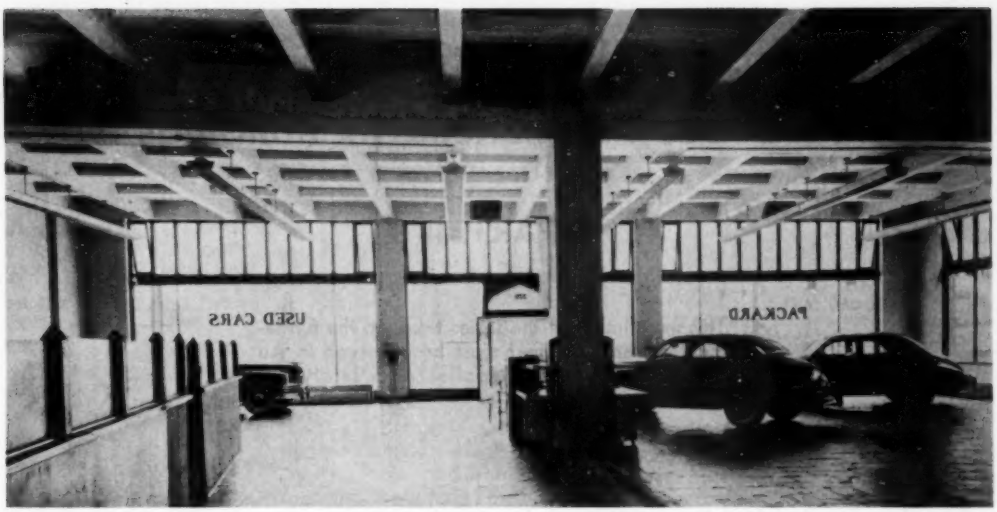
EVAPORATIVE cooling has had a tremendous growth in popularity in the southwestern section of the United States. This method of lowering the temperature of air by evaporation of water has the virtues of low first cost and economical operation to recommend it.

More recently there have been a number of evaporative cooling installations in the southeastern part of the country, not normally regarded as a fertile field for this type of cooling. These installations have been made in industrial and commercial establishments where comfort conditions during summer heat are quite important. Several textile mills have installed evaporative cooling equipment to keep their workers comfortable and at peak efficiency.

*Alton Mfg. Co., Dallas, Tex.

Auto Showroom

One of the largest evaporative cooling installations in Atlanta, Georgia was made in the Atlanta Packard Co. showrooms. The contractor for the job was Dene



Discharge grilles can be seen at the ceiling.

Christopher of that city.

Six units of 12,000 cfm capacity each were mounted on the roof of the building, as shown in the photo. The method of installation was planned to keep ductwork to a minimum. The duct on the discharge side of the unit makes a 90 deg turn and passes through the roof. Cooled air is discharged into the occupied zone through a grille which is placed at an angle of 45 deg to the ceiling.

All Fresh Air

The system was designed to provide 40 air changes per hour in the auto showroom. No air is recirculated, only fresh air passing through the system. It was not necessary to install mechanical exhaust equipment. Existing openings in the building, doors, windows, transoms, etc., made possible adequate, speedy exhaust of air to the outside.

No major problems were encountered. Placement of the evaporative cooling units on the roof eliminated any need for taking up valuable floor space. Design and placement of the discharge grilles resulted in even distribution of cooled air throughout the showroom.

Easy Installation

Simplicity of installation of evaporative cooling can be observed in the illustrations. Successful jobs now operating in Georgia and other sections of the Southeast indicate that there is a further sales potential in that area. This low cost, effective means of cooling is bound to become more popular in the warmer sections of the country to which it is adapted.

New Estimate Form Ready

A New Tentative Short Form for estimating costs connected with the installation of warm air heating systems has been published by the National Warm Air Heating and Air Conditioning Association. This new Form 6, titled Job Estimate Forms For Warm Air Heating Systems was developed by the installation codes committee to meet the contractor's need for a simple, quick method to figure jobs for estimating purposes.

The first step in estimating the cost of installing a heating system is determining the size of furnace required. This requirement is based on the heat loss of the house. To determine heat loss, the association recommends use of the crackage method and that is specified with Form 6. It is greatly simplified by figuring the heat loss of the home as a whole instead of figuring the heating requirements room by room. The number of warm air outlets required is obtained by then dividing total heat loss of the house by the average Btu per hour delivery which the contractor wishes to use for each outlet. The factor 8,000 Btuh has been used in Form 6 and represents a preference of a number of dealers. Three tables are included in the form for use in determining the return air requirements for gravity and winter air conditioning systems and for perimeter warm air heating.

Copies of the new form are available from association headquarters, 145 Public Square, Cleveland, Ohio at $6.00 per hundred. A membership discount of 40 per cent is given.

Standards For Installation Of Gas Piping And Gas Appliances In Buildings

PART II

This installment of the series takes up the fundamental standards that must be observed in the installation of any gas appliance for safety and customer satisfaction.

2.11.3 In Case Test Hand Does Not Move

In case careful observation of the test hand for a sufficient length of time reveals no movement, the pipe shall be purged and a small gas burner turned on and lighted and the hand of the test dial again observed. (See provisions of 2.12.) If this dial hand now moves (as it should) it will show that the meter is operating properly. If the test hand does not move or register the flow of gas through the meter to the small burner, it is certain that the meter is defective and the gas should be turned off and the gas company notified.

2.11.4 In Case Meter Test Hand Moves

In case the test hand shows movement, all appliances or outlets supplied through the meter shall be examined to see if they are turned off and do not leak. If they are found tight, movement of the test hand will indicate that there is a leak in the piping system. The meter valve shall be turned off until the necessary repairs have been made, after which the test specified in 2.11.2 shall be repeated.

2.12 Purging

2.12.1 Purge All Gas Lines

After the piping has been checked, all piping receiving gas through the meter shall be fully purged. A suggested method for purging the gas line to an appliance is to disconnect the pilot line at the outlet of the pilot valve. Under no circumstances shall a line be purged into the combustion chamber of an appliance.

2.12.2 Light Pilots

After the piping has been sufficiently purged, all appliances shall be purged and the pilots lighted. The installer shall assure himself that all piping and appliances are fully purged before leaving the premises.

2.12.3 Purging Large Lines with Inert Gas

Lines of 4 in. iron pipe size or larger should be purged with carbon dioxide, nitrogen or a mixture of the two. For detailed procedure consult the local gas company.

Appliance Installation

Under this caption appear the fundamental standards which must be observed during the installation of any gas appliance or accessory so as to assure safety and satisfactory service as well as consumer satisfaction.

3.1 General

3.1.1 Appliances and Accessories to Comply with Standard Requirements

Each gas appliance and accessory designed for domestic or commercial use should be of a type complying with applicable American Standard Approval or Listing Requirements covering safe operation, substantial and durable construction and acceptable preformance. Such compliance may be determined by the presence on the appliance or accessory of a label of a nationally recognized testing agency* qualified and equipped to perform the tests necessary to determine such compliance and maintaining an adequate periodic inspection of current production models and whose label on the appliance or accessory states that it complies with national safety requirements. Such compliance may also be determined by the listing of the appliance or accessory in a list published by such nationally recognized testing agency, which states that the appliance or accessory complies with national safety requirements. The inclusion of provisions for the installation of unlisted appliances and accessories shall not be construed as acceptance of such equipment from the standpoint of general design, construction or performance.

In cases where no applicable American Standard Approval or Listing Requirements have been developed for a given class of appliance or accessory, approval of the proper administrative authority should be obtained before the appliance or accessory is installed.

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* *The American Gas Association, Inc., Laboratories are such a nationally recognized testing agency.*

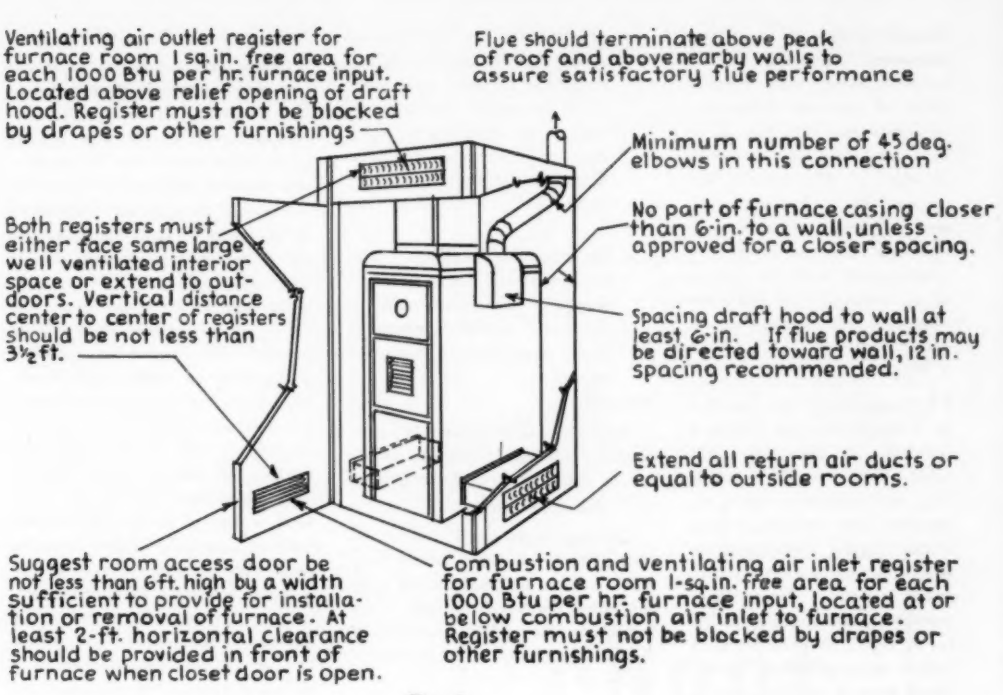

Ventilating air outlet register for furnace room 1 sq. in. free area for each 1000 Btu per hr. furnace input. Located above relief opening of draft hood. Register must not be blocked by drapes or other furnishings
Flue should terminate above peak of roof and above nearby walls to assure satisfactory flue performance
Minimum number of 45 deg. elbows in this connection
No part of furnace casing closer than 6-in. to a wall, unless approved for a closer spacing.
Spacing draft hood to wall at least 6-in. If flue products may be directed toward wall, 12 in. spacing recommended.
Extend all return air ducts or equal to outside rooms.
Both registers must either face same large well ventilated interior space or extend to outdoors. Vertical distance center to center of registers should be not less than 3½ ft.
Suggest room access door be not less than 6 ft. high by a width sufficient to provide for installation or removal of furnace. At least 2-ft. horizontal clearance should be provided in front of furnace when closet door is open.
Combustion and ventilating air inlet register for furnace room 1-sq. in. free area for each 1000 Btu per hr. furnace input, located at or below combustion air inlet to furnace. Register must not be blocked by drapes or other furnishings.

Fig. 2

3.1.2 Listed Appliances and Accessories

The word "listed" used in connection with appliances and accessories throughout the present text refers to appliances and accessories which are shown in a list published by a nationally recognized testing agency, qualified and equipped for experimental testing, and maintaining an adequate periodic inspection of current production of listed models and whose listing states either that the appliance or accessory complies with nationally recognized safety requirements or has been tested and found safe for use in a specified manner.

3.1.3 Type of Gas

It shall be determined that the appliance has been designed for use with the gas to which it will be connected. No attempt shall be made to convert the appliance from the gas specified on the rating plate for use with a different gas without consulting the local gas company or the manufacturer for complete instructions.

3.1.4 Permissible Temperatures on Combustible Material

All gas appliances and their flue or vent connectors shall be installed so that continued or intermittent operation will not create a hazard to persons or property. They shall not, during operation, raise the temperature of unprotected combustible walls, partitions, floors, or ceilings more than 90 F above normal room temperature when measured with mercury thermometers or conventional bead type thermocouples. (When wall and partition temperatures are measured with disc type thermocouples as specified in American Standard Approval Requirements for the types of appliances involved, an indicated temperature rise of 120 F will correspond to the 90 F rise measured with thermometers or conventional bead type thermocouples.)

Minimum clearances between combustible walls and the back and sides of various conventional types of appliances and their flue or vent connectors are specified elsewhere in these standards.

3.1.5 Air for Combustion

Appliances shall be installed in a location in which the facilities for ventilation permit satisfactory combustion of gas and proper venting, under normal conditions of use. While all forms of building construction cannot be covered in detail, this requirement may usually be met by application of one of the following methods in ordinary building construction:

a. In buildings of conventional frame, brick, or stone construction without enclosed appliance rooms, basement storm windows, or tight stair doors, infiltration is normally adequate to provide air for combustion and draft hood dilution.

b. Where appliances are installed in a confined space within a building having adequate air infiltration, provisions shall be made for supplying this space with air for combustion and ventilation. This may be ac-

complished through use of two permanent openings freely communicating with interior areas of adequate infiltration in accordance with Fig. 2, or by compliance with provisions of item "c." If necessary, continuous ducts having cross-sectional areas equal to the openings shall be utilized to communicate with the source of air supply. The minimum dimension of rectangular air ducts shall be not less than 3 in.

c. Where appliances are installed in a confined space within a building of unusually tight construction, air for combustion and ventilation must be obtained from outdoors or from spaces freely communicating with the outdoors. (Crawl space or attic.) Under these conditions, the openings called for in Fig. 2 shall be replaced by two openings having a combined area of not less than 1 sq in. per 1000 Btu per hour of input rating. One opening shall be near the top of the enclosure and one near the bottom. These openings shall be of approximately equal area and shall communicate with the selected source or sources of adequate air supply, by ducts. Where ducts are required, they shall be continuous and of the same cross-sectional area as the openings to which they connect. The minimum dimension of rectangular air ducts shall be not less than 3 in. Any duct from the top opening must be horizontal or pitched upward.

d. Where appliances are installed in unconfined spaces, such as a full basement, within a building of unusually tight construction, air for combustion and ventilation must be obtained from outdoors or from spaces freely communicating with the outdoors. Under these conditions a permanent opening or openings having a total free area of not less than 1 sq in. per 1000 Btu per hour of input rating shall be provided. Where ducts are required, they shall be of the same cross-sectional area as the openings to which they connect. The minimum dimension of rectangular air ducts shall be not less than 3 in.

e. Operation of exhaust fans, kitchen ventilation systems or fireplaces may create conditions requiring special attention to avoid unsatisfactory appliance operation.

3.1.6 Venting

Appliances shall be vented in accordance with the provisions of the section titled Venting of Appliances.

3.1.7 Flammable Vapors

Gas appliances shall not be installed in any location where flammable vapors are likely to be present, unless the design, operation and installation are such as to eliminate the possible ignition of the flammable vapors.

3.1.8 Accessibility

Every appliance shall be located so that it will be readily accessible for operation and servicing.

3.1.9 Avoid Strain on Piping

Gas appliances shall be adequately supported and so connected to the piping as not to exert undue strain on the connections.

3.1.10 Extra Device or Attachment

No device or attachment shall be installed on any appliance which may in any way impair the combustion of gas.

3.1.11 Combination of Appliances

Any combination of appliances, attachments or devices used together in any manner shall comply with the standards which apply to the individual appliances.

3.1.12 Use of Air or Oxygen Under Pressure

Where air or oxygen under pressure is used in connection with the gas supply, effective means shall be provided to prevent air or oxygen from passing back into the gas piping. The local gas company shall be consulted for details.

3.1.13 Venting of Pressure Regulators

Gas appliance pressure regulators requiring access to the atmosphere for successful operation shall be equipped with a vent pipe leading to the outer air or into the combustion chamber adjacent to a constantly burning pilot, unless constructed or equipped to limit the escape of gas from the vent opening in the event of diaphragm failure to not more than 1.0 cu ft per hour of a 0.6 sp. gr. gas at 7 in. water column pressure. In case of vents leading to the outer air, means shall be employed to prevent water from entering this pipe and also to prevent stoppage of it by insects and foreign matter. In case of vents entering the combustion chamber, the vent shall be located so that the escaping gas will be readily ignited from the pilot flame and the heat liberated will not adversely affect the operation of the thermal element. The terminus of the vent shall be securely held in a fixed position relative to the pilot flame. For manufactured gas a flame arrester in the vent line may also be necessary.

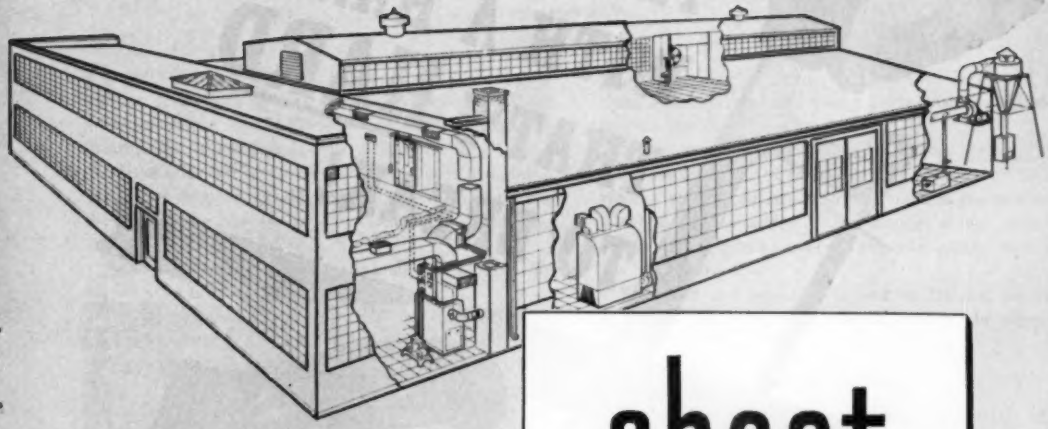
3.2 Appliance Connections to Building Piping

3.2.1 Connecting Non-Portable Appliances

Non-portable appliances such as central heating, water heating and similar equipment shall be connected to the gas piping with rigid pipe or by approved semi-rigid tubing not more than 2 ft in length.

3.2.2 Connecting Ranges, Hot Plates, Refrigerators and Similar Equipment

Domestic gas ranges, hot plates, refrigerators, etc., shall be connected to the gas piping with rigid pipe, approved semi-rigid tubing or approved appliance connectors of flexible metal tubing and fittings. When a semi-rigid tubing connector or a connector of flexible metal tubing and fittings is used, it shall connect to an outlet in the same room as the appliance. The length of the connector should not exceed 6 ft. The connector shall be installed so as to be protected against mechanical injury.



sheet metal Section

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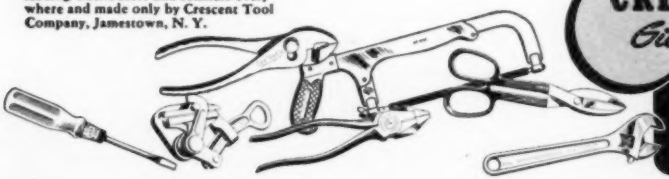

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Fundamentals Of Sheet Metal Practice

PART II

CHARLES SEEL
Alexandria, Va.

HAND shears or snips are made in various types for general or special cutting purposes. A sheet metal mechanic should have at least three pairs of shears: 1) A combination or buffalo snips of about No. 18 size for use up to 22 gauge; 2) a pair of bulldog shears for heavier metal; and 3) a pair of aviation shears. (If he has this type in both right and left he will be well equipped.)

Some mechanics also own a small No. 7 size for use on very thin steel or aluminum.

The introduction of aviation snips has eliminated the need for a circular or curved snips, although many men still use them. It never pays to buy a cheap pair of snips. Those of standard make are best in the long run. They might cost a little more at first, but will last for many years.

There are several things to be remembered in caring for snips. 1) Keep the cutting edges well oiled, also the shear blades. 2) Do not have the blades too tight, or too loose. Adjust them occasionally. 3) Never use snips to cut wire, rod, or across a weld. Don't abuse them. 4) Never allow anyone to sharpen snips except someone skilled enough to do it properly. The practice of sending snips back to the manufacturer for overhaul once a year is a good one.

In making straight cuts across the sheet or lengthwise, proceed as follows: Grasp the shears, open the blades as far as convenient and cut by closing the jaws just short of the end, to prevent distorting the sheet. Proceed in this manner until full length is cut. When cutting wide sheets use of an adequate weight will prevent the sheet from sliding and aid accuracy. When long sheets are cut into strips the same practice will be beneficial. When long cuts are made, the narrower section of the sheet is sometimes rolled into a circle, then leveled after the cut has been completed.

There are two practices which make cutting with snips much easier: if the snips are tilted slightly to the right, a marked difference will be noted in the ease with which a cut is made; if the handle of the snips is rested on the bench whenever possible, greater leverage can be obtained.

Whenever convenient it is best to lay out patterns in such a way as to make one cut produce the edges of two pieces. Fig. 9.

Circle Cutting

When cutting circles in light gauge metal, after marking out the circle, cut off the corners so that the blank has the appearance of an octagon. Have the metal flat, keep it on the bench with a section projecting over the edge and cut around the circumference. The shears will be off the bench, and the waste material will be bent downward. Be sure to keep the circle flat. Place a weight on the circle to hold it, if necessary. When cutting circles from heavier gauges the procedure will be reversed. The shears should rest on the bench to obtain greater leverage.

In making inside circular cuts a hole can be punched in the center of the metal to be cut out, aviation snips inserted, and a curved cut made to the line of the circle. This can be done with either right or left hand snips. It is well to remember that there are two types, right and left. Some mechanics prefer to cut an interior circle to the right as the waste metal is curled upwards and the sheet remains flat. Circular rings can be cut

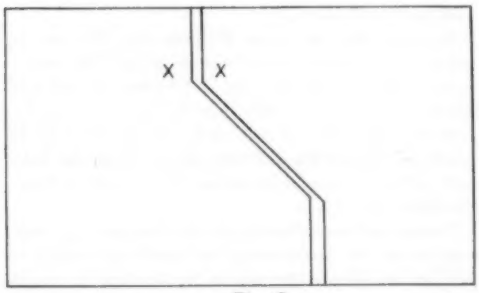


Fig. 9

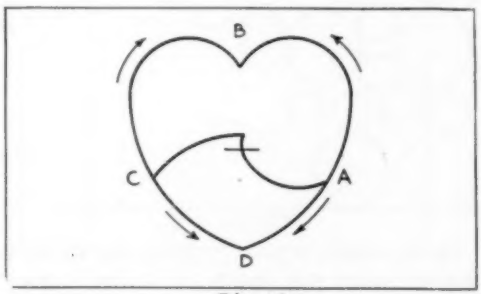


Fig. 10

out either way, by a left or right hand cut.

It is sometimes necessary to cut holes of intricate shape in the inside of a sheet. The first step is make provisions to insert the aviation snips. The right side is then cut with left hand snips and the left side with right hand snips. Fig. 10 shows a heart shaped hole where the cut from *A* to *B* is made first, then a new cut from *C* to *D*. Both cuts are made with a left hand snips. The hole is completed by making cuts from *C* back to *B* and with *A* to *D* a right hand snips. This will eliminate any need to mark the sheet on both sides. Where only one type of snips is used it is necessary to mark each side of the blank. Aviation snips will curl up the waste material and the finished sheet will remain in a level condition.

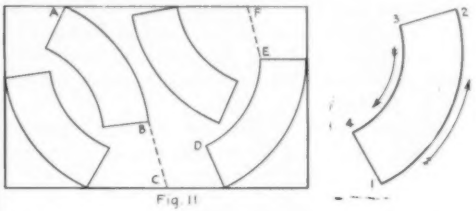


Fig. 11

When cutting curved or irregular shaped sections, which have been interlaced in order to save material, cut on the line whenever possible in order to reduce double cutting. In Fig. 11 cut from *A* to *B* on the line, and then cut from *B* to *C*. Also from *D* to *E* and then to *F*. The single sections are then cut out by shearing each one from *1* to *2* and *3* to *4*, using straight shears. Caution: when cutting, the snips should not be closed completely, as this will cause a distortion of the metal.

All rough or jagged edges should be smoothed with a mallet or file after cutting. If this precaution is not taken further handling of the sheet will be dangerous.

The author was called upon at one time to cut 36 circles of varying diameters from material which cost 75 cents per square foot. The statement was made that there was only one sheet in stock and it had been figured exactly for size.

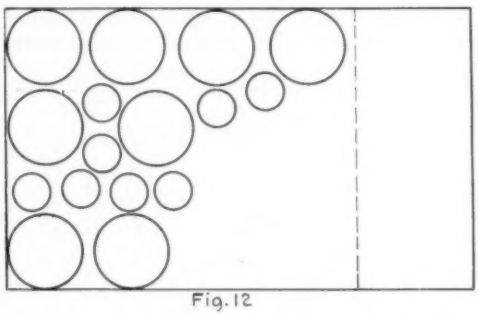


Fig. 12

On examination it became apparent that the stock man had figured each circle to be cut from a square blank. In laying out the sheet the larger circles were spread apart in order to allow placement of the smaller ones in what would otherwise be waste metal. Fig. 12. As a result of this layout only three quarters of the sheet was required. When the remainder was returned to stock, the stock clerk had to count the pieces before he would believe it.

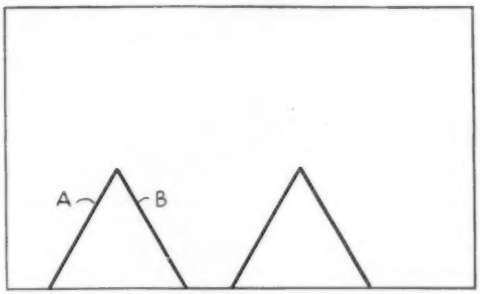


Fig. 13

Notching

Fig. 13 shows a sheet notched with a pair of combination or bulldog snips. In order to do a good job of notching the snips should be well oiled, have the points lapping over each other slightly, and the blades just loose enough to enable the worker to open them easily. The cut can be made at *A* and then *B*, with the points of the shears extending to the inside limit of the notch and the shears closed completely. Care should be exercised when making the final cut to prevent the notched piece from flying up and hitting another workman. When a series of notches are to be made, the grip on the snips can be varied by holding the bottom handle with the fingers on the outside rather than the inside.

When notches are to be made in several directions, as in the case of a cornice mitre, a number of cuts running in the same direction are made first. Then the sheet is turned and cuts made in another direction and this procedure followed until completion.

If two or more cuts are required in the same direction (Fig. 14), cut in the following manner: Start at *1*, cut to point *2* with the points of the shears, hold the shears at *2* and curl up *X* by swinging the shears to the left and cut to *3*. Make a new start at *4*, cut to *5*, curl up *Y* and cut to *3*.

For the other side make the same cuts, but curl the corners at *A* and *B* down instead of up. On heavier gauges like 18, 16, and 14, it is better to cut with the rear of the snips rather than the points, for greater leverage. Punching a hole of 1/8 in. diameter at the points of the notches and then cutting in to the holes with either a snips or throatless shears will be found effective. Fig. 15.

There are times when it is only necessary to make one cut or slit in the metal to enable the worker to bend a lap. This is the case in bending laps on rounds or ogee members of a cornice, moulded gutter, etc.

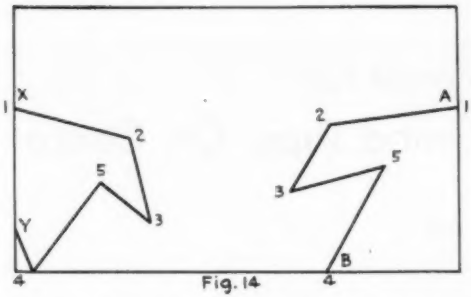


Fig. 14

Reference to Fig. 16 will show that on the inside curve *A* there is no danger of the laps riding on each other. At the outside curve *B* the notches will have to be V shaped to prevent interference as they are bent down. This is the reason that laps on T joints are snipped and not notched out.

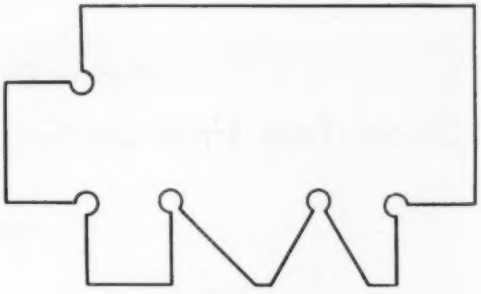


Fig. 15

Bending or Braking

There are several types of machines designed to bend sheet metal. The most widely used are the bar folder, the cornice brake, and the box and pan brake.

(*Please turn to page* 104)

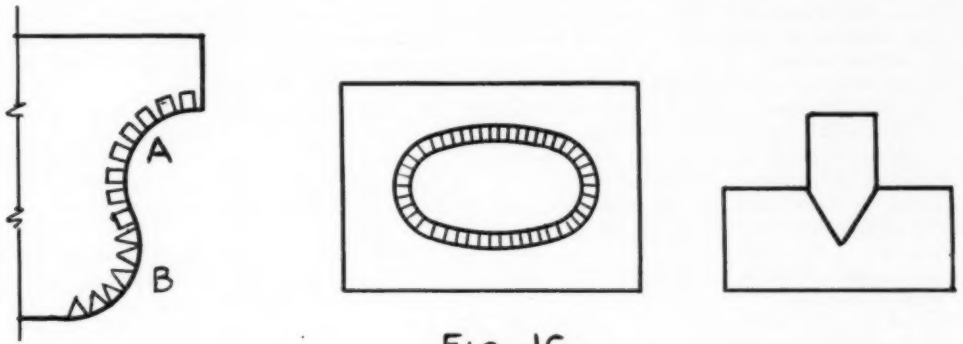


Fig. 16

Another point to remember when notching laps is to be sure they are cut away from the bend line and away from the 90 degree angle so there will be no interference when the work is assembled. In Fig. 17 this method is shown in a box corner. The laps would be notched as follows: At *A* they are cut away from the bend line, and at *B* away from the 90 deg.

In Fig. 18, sketch of one side of a modillion block, it will be noticed that the cuts marked *1* are cut away from the bend line, number *2* cuts are cut away from 90 deg. and number *3*, while not necessary are cut the same as *1*. The cuts marked *4* are principally for appearance. Number 5 cut is made away from the bend line so it will not interfere when placed in the cornice. Number *6* is frequently cut away, although it is not essential.

No laps are needed on the quarter round member, but if used, the front end would be notched and the laps bent inside, and the back snipped and laps bent outside. The pattern is marked for 8 modillions or 16 sides, that is, 15 more right and left.

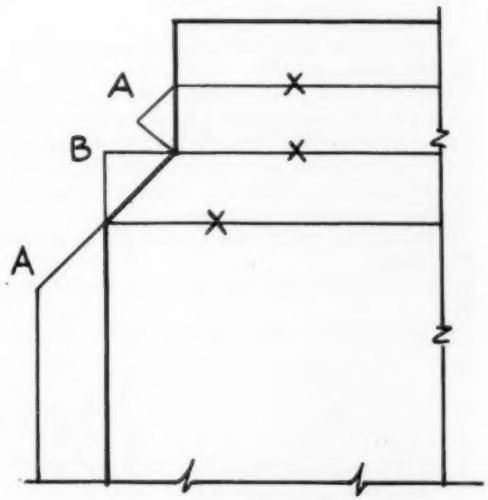


Fig. 17

Pattern Development For

Shoe Tee Intersecting Round Pipe On Center

HUGH B. REID

IN the March issue of AMERICAN ARTISAN, a shoe tee intersection was presented for light metal work in which the 45 deg offset side of the fitting was oval in shape. This would be impractical in heavy plate work, owing to the added time required to form the oval shape. Some change in design must be made to simplify the fabrication. This is accomplished by converting the offset side from an oval to a round shape, thus making it possible to form the true shape in the power rolls. This will be time saving and will cut cost.

Consideration must also be given to metal thickness. The following is a simple rule and is applicable to all heavy plate work. As an example, a 12 in. diameter dimension will be placed on the pipe end of the shoe tee and it will be fabricated using ¼ in. plate.

To find the stretch out for the inside diameter, add one thickness of metal to the given diameter and multiply by 3.14.

Example: 12in. + ¼in. = 12¼ = 12.25 × 3.14 = 38.46 = 38-15/32.

To find the stretch out for the outside diameter, subtract one thickness of metal from the given diameter and multiply by 3.14.

Example: 12in. — ¼ in. = 11¾ = 11.75 × 3.14 = 36.89 = 36-57/64.

To find the stretch out for the mean diameter, multiply the given diameter by 3.14.

Example: 3.14 × 12in. = 37.68 = 37-11/16.

The pictorial drawing gives a suggested standard for a shoe tee fitting. This is based on having the entrance at the main twice the area of the diameter of the shoe tee. This will be equivalent to a friction loss of approximately fifteen diameters of the shoe tee.

Following is a step by step solution for the pattern development.

The simplified method drawing is constructed as follows:

a) Draw the line marked *AA-BB*. On this line establish point *A* and from point *A* draw the line *A-1* perpendicular to line *AA-BB;* the length of which will be equal to the shoe tee diameter plus the required collar allowance as shown by distance marked *V*.

b) From point *1* on line *A-1* draw a line at 90 deg to line *A-1* and measure the required diameter of the shoe tee as indicated by line *1-7*.

c) From point *7* on line *1-7* draw a line at 90 deg to line *1-7* and measure the required collar length as shown by distance marked *V*.

d) From point *7′* on line *7-7′* draw a line at 45 deg to line *V* and intersecting line *AA-BB* at *L*.

e) From point *O* on line *1-7*, and with distance *O-1*, as radius, draw a half circle and divide into six equal spaces as shown by numbers *1* to *7* inclusive.

f) With point *A* on line *AA-BB*, as center and the radius of the shoe tee marked *SR*, draw a 90 deg arc and divide into three equal spaces.

g) From a point on the extended line *1-A* draw a long arc the radius of which is equal to half the required pipe diameter as shown on the end view.

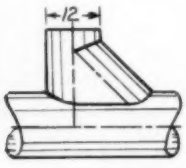
h) Through the points marked *1*, *2*, *3*, *4* on the half circle marked *SR* draw lines parallel to line *1-4* as indicated by letters *N*, *Q*, *R*.

j) Establish the line marked work line *2*. This line can be drawn at any point between *7′-L*. On work line *2* measure the distance *SR* and draw the line marked *4′-H′*, this line will be at 45 deg to line *O-G′*. From the intersecting points *4′* and *7′*, draw the line as shown.

k) From points *5* and *6* on radius line *SR*, draw lines passing through line *4′,-7′* to intersect line *1-7*. From points *5′*, *6′*, draw lines parallel to line *7′-L*.

l) From points *B*, *C*, *D*, on *LR* radius, draw lines parallel to line *AA-BB* and intersecting line *N* at

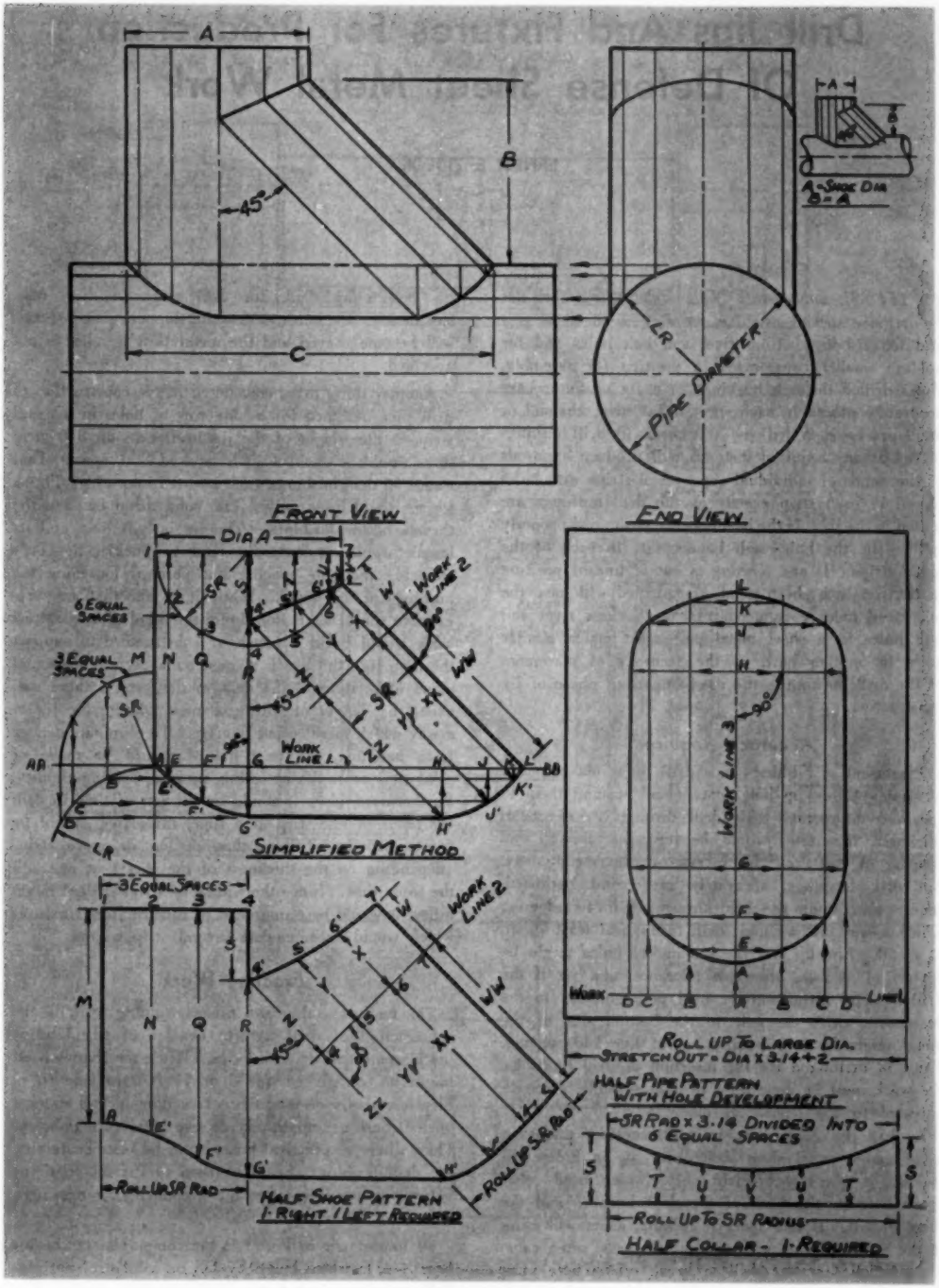
(Please turn to page 158)



INSIDE DIAMETER

OUTSIDE DIAMETER

MEAN DIAMETER


A
B
C
45°
LR
PIPE DIAMETER
A = SHOE DIA
B = A
FRONT VIEW
END VIEW
DIA A
6 EQUAL SPACES
3 EQUAL SPACES
WORK LINE 2
WORK LINE 1
WORK LINE 3
SR
45°
90°
SIMPLIFIED METHOD
3 EQUAL SPACES
ROLL UP SR RAD
HALF SHOE PATTERN
1 - RIGHT 1 LEFT REQUIRED
ROLL UP SR RAD
ROLL UP TO LARGE DIA.
STRETCH OUT = DIA X 3.14 ÷ 2
HALF PIPE PATTERN
WITH HOLE DEVELOPMENT
SR RAD X 3.14 DIVIDED INTO
6 EQUAL SPACES
ROLL UP TO SR RADIUS
HALF COLLAR - 1 REQUIRED

Drill Jigs And Fixtures For Production Of Defense Sheet Metal Work

ERNEST E. ZIDECK

DEFENSE Subcontract Sheet Metal Work does not require special machines or dies, as much as jigs and fixtures for drilling rivet and bolt holes and for holding smaller components in position for assembly. Holes drilled through bushings in a jig or fixture are accurately placed in each sheet metal strip, channel or angle processed. A drill jig 10 ft long, with drill bushings placed at any required distance will produce hundreds or thousands of individual sheet metal strips with holes placed in each strip exactly as the drill bushings are placed in the jig. If the bushings are positioned properly in the jig, the holes will be accurate in each of the metal strips. If one bushing is out of line or position in the jig, each sheet metal strip drilled will have the misplaced hole reproduced. In many cases rivet and bolt holes in a sheet metal part must match similar holes in another part, so the accuracy of placement of the drill bushing is the most important phase of jig construction.

Accuracy Required

Placement of bushings in a drill jig is not a matter of simply lining up hole centers and spacing them to specified dimensions. To drill through $\frac{1}{16}$ in. metal thickness, the result would be the same line-up and spacing of holes on the reverse of the metal sheet. But drill bushings, accurately made and hardened, require a minimum metal thickness of $\frac{3}{16}$ in. to lodge in; which means that we must drill through at least $\frac{3}{16}$ in. of metal. Line-up and the spacing of holes might be correct to .005 in. allowable tolerance, and yet if the drilled metal is not solidly held perpendicular to the descending drill, the hole in the bottom side of the metal might be considerably out of line and spacing. Thus, in drilling a jig for insertion of drill bushings, the work must be done on a drill press table, precisely adjusted to the horizontal plane.

In drill jig construction we must consider that even a 24 gauge metal sheet drilled for $\frac{1}{8}$ in holes will produce a quantity of drill chips which need relief space between the base of the drill bushing and the sheet drilled. If this space is lacking, chips will cling to the drill and clog up its spiral channels, often causing a small diameter drill to break off. There must also be clearance under the sheet, immediately below the descending drill, for drill chips to drop into. Frequently, the holes drilled in thinner gauge sheets, will become ragged and the metal torn if relief is not provided.

Another thing to be considered in the construction of drill jigs, designed for a long row of holes in a metal strip, is the weight of the jig itself. In an 8 ft strip there would be about 96 holes spaced 1 in. apart. That means 96 drill bushings, each inserted into a $\frac{1}{4}$ in. hole, which would leave only $\frac{3}{4}$ in. solid metal between the throats of the bushings. The jig is 8 ft long and its length would undoubtedly tend to buckle, not only changing the hole spacing but perhaps loosening the bushings in the metal. While it is true that any progressive sheet metal shop doing this kind of subcontract work would build a bench or substructure to support the long jig (the bench aligned on a perfect horizontal plane in relation to the drill in the press), there still exists the danger of lifting or manipulating the jig in a way which might cause damage. To eliminate danger from handling, the drill fixture should be made of solid steel or angles extending upward, lending rigidity. Furthermore, since it would be a waste of time to drill the holes in one strip at a time, these jigs should be constructed for drilling through ten or more strips (depending on the thickness of the sheet) at one and the same time. Since the widths of strips drilled might differ, it would be economical to construct drill fixtures which would accommodate several strip widths.

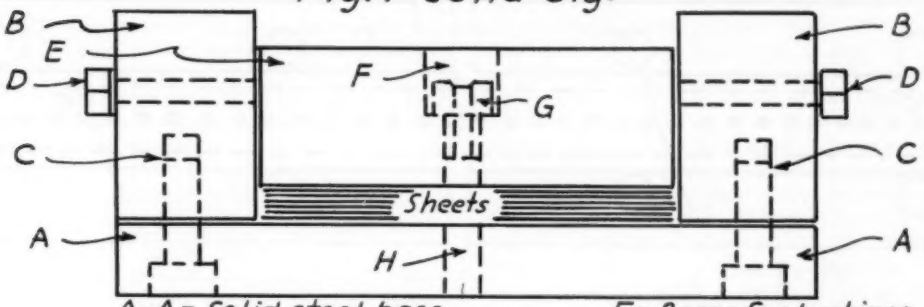
Exacting Work

The really exacting and time-consuming work in the construction of drill fixtures or jigs of any kind is the placement of drill bushings. While the fixture itself might be constructed, for 8 or 10 ft strip lengths, in fifty man-hours or less, the correct line-up and spacing of drill bushings might take up two hundred man-hours. Thus, wherever practical the same metal plate containing the drill bushings should be used for as much of the fixture, as possible. See the accompanying drawings, Fig. 1 to 7, inclusive.

Of importance in Fig. 1 is the comparatively shallow base *A-A*, to which bolt 1 by $1\frac{1}{2}$ in. solid steel uprights *B-B*, preventing the fixture from bending easily. *C-C*

Drill Jigs For Rivet Holes in Long Reinforcing Strips Braked to Channel.

Fig. 1 Solid Jig.



A-A = Solid steel base
B-B = 1 × 1½ in. solid steel
C-C = 5/16 in. steel screws
D-D = Cap screws through B-B
E = 1×3 in. solid steel
F = Bores for bushings
G = Drill bushings
H = Hole for drill passage

Fig. 2 Adjustable Jig.

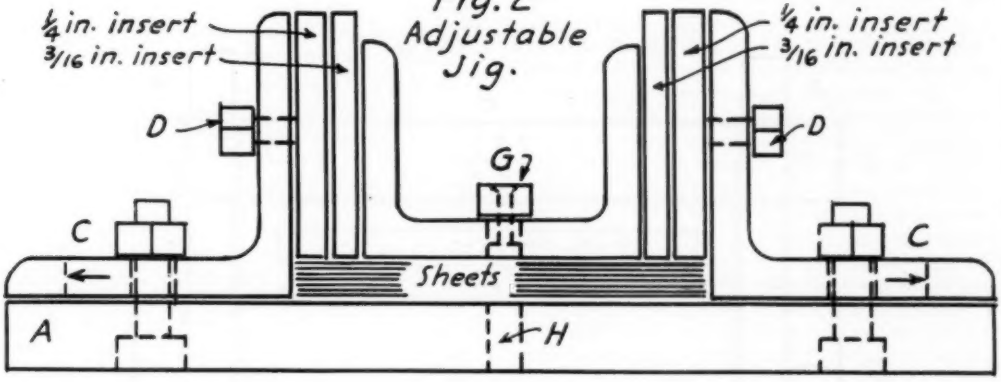


Fig. 3 Enlarged View of Inserted Drill Bushing

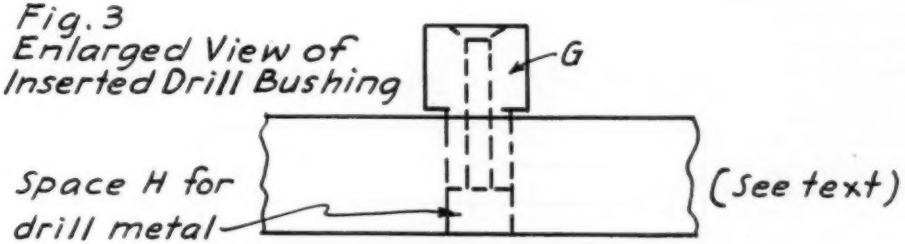


Fig. 4 Drill Fixture with Inserts Holding Varying Widths of Sheet Strips

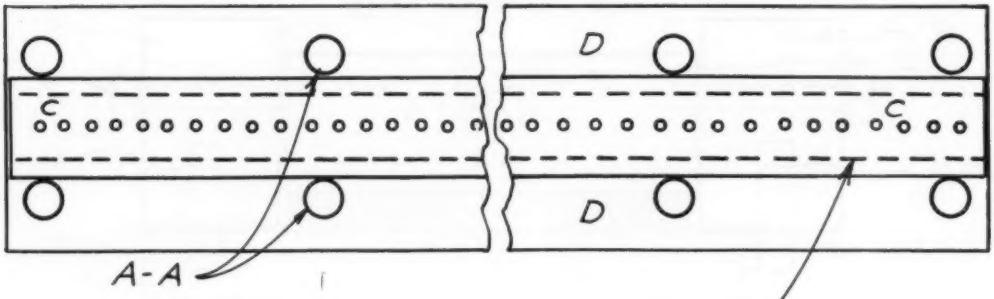


Fig. 5 Insert 2½ in. Strips

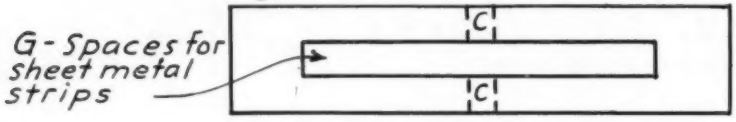


Fig. 6 Drill Fixture

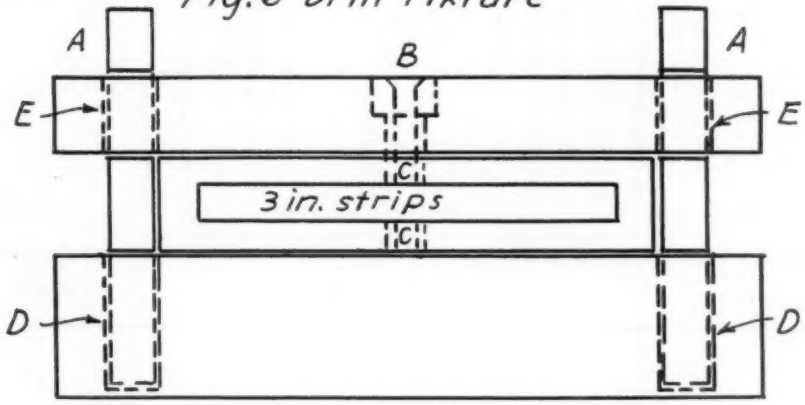
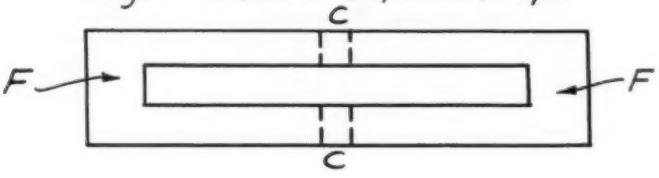


Fig. 7 Insert 2¾ in. Strips



are $\frac{5}{16}$ in. thick, hardened steel screws, holding *B-B* to *A-A*. Through the solid steel of *B-B* are threaded cap screws *D-D*, which secure plate *E*, holding drill bushings *G*, between the uprights *B-B*. It will be noted that *E* is solid steel 1 in. thick. This leaves ½ in. solid steel spacings between the holes *F* in which the bushings *G* are countersunk. These ½ in. spacings prevent plate *E* from bending in the middle along the row of holes for the bushings. Hole *F* reaches down to about the middle of *E*, with the bushing extending enough to leave the relief hole *H* through the base plate *A-A* into which drill chips fall from the series of sheets, inserted as shown in the drawing.

Single Width

The jig Fig. 1 is constructed for only one width of sheet metal strip. Viewing the drawing we see that by loosening cap screws *D-D*, the segment *E*, holding the drill bushings *G*, can be lifted out of the combination *A-A* and *B-B*, along with the sheet strips. The accumulated drill chips are removed before the next bundle of strips is inserted. Sheet strips will not be entirely smooth and level over the full length so before tightening the cap screws *D-D*, precaution should be taken that *E* is compressing the sheet strips uniformly, so that each drill bushing will be exactly vertical. In placing bushings into *E* we measure upon the bottom of *E*, (not on its top), to have the correct line-up and spacing immediately above the sheets to be drilled.

Drill jig Fig. 2 has the same base *A-A*, but instead of solid steel uprights *B-B*, it uses angles, which might be duro-aluminum extrusions, uniformly straight and smooth. Bolts *C-C* hold the angles to the base. Cap screws *D-D* thread through the metal of the angle and press against the loose inserts, which might be ¼ or $\frac{5}{16}$ in., or any other widths. The bushings *G* are inserted in a suitable size channel, with its upright flanges serving the same purpose as *B-B* in Fig. 1, preventing the jig from bending. The relief opening for drill chips, *H* is the same as in Fig. 1. This is an adjustable fixture, with bolts *C-C* moving in slots, narrowing the space required for different widths of sheet strips. Commonly, in fuselage reinforcing strips the sheet widths are 2½ in., 2¾ in., and 3 in. But whatever the required width of the strip, it can be accommodated in this fixture by the use of the proper insert as shown in the drawing.

Fig. 3 depicts a drill bushing inserted above relief opening *H*, in which drill chips accumulate. These drill bushings can be purchased in many sizes and are inserted into a base drilled and reamed slightly undersize, using a press fit. It is not advisable to tack-in drill bushings by welding, as the heat would soften the bushing or perhaps cause it to crack. If the hole for the bushing allows a press fit the bushing will hold securely enough, provided the fixture is constructed rigidly, as explained above.

A different drill fixture is shown in Fig. 4, 5, 6, and 7. Here the base *D-D* holds a series of shafts *A-A*, upon which it moves up and down. The shafts are placed accurately, leaving free space between them for inserts Fig. 5 (and others required), to slide in as shown by *C-C* in Fig. 4. These inserts are of a uniform width, each fitting between shafts *A-A*, as shown in Fig. 6. The inserts must move between the shafts without binding or play. Spaces *G*, in Fig. 5, are exactly of the dimensions of the respective strip widths, to allow insertion and extraction of strips. Each insert has holes *C-C*, for drill chips. Strips are usually slightly longer than the insert, making handling of the strips easier. Bushing *B* is shown recessed in the metal of the upper plate, *E-E*, which may be supported by pieces of rubber between it and the base *D-D*, and might also be secured by nuts threading over shafts *A-A*. The fixture is easily constructed of steel plates of standard widths and thicknesses and of $\frac{5}{16}$ in. or ¾ in. drill rod for shafts.

The construction might be preferred in cases where various width strips are processed. The inserts simply hold the strips in the right place under the bushings, and one only set of bushings is required for drilling holes in a number of strip widths, as shown in the drawings by markings for 2½, 2¾, and 3 in. strip widths, respectively. If enough time is taken to construct the number of the inserts, each accurately for its own strip width, better results will be obtained more quickly than by use of the adjustable fixture, Fig. 2.

In showing and describing by text several constructions of drill jigs used in aircraft sheet metal work the author simply makes the reader acquainted with what has been used and is still in use in shops doing that kind of work in aircraft factories and in shops subcontracting for same. The subcontractor must judge for himself, choosing the tools which would do the work. Many shops have hole punching equipment operating in conjunction with their press brakes. This equipment can be well adapted for providing the long strips of metal with small rivet holes. Since various width strips can be finished in the brake by holding the strip between gauges and all holes punched at one operation, it is evident that the work can be done as quickly as by drilling several strips, hole by hole.

Hand Mills Make Steel

WHILE STEEL PRODUCTION is at a record pace and capacity is being expanded in the shortest possible time, a number of old hand mills are in operation doing what they can to ease the sheet steel shortage.

In the hand mill method of producing steel sheets, workers stand on either side of the rolls and pass sheet bars and sheets back and forth until the desired thickness is obtained. One of these mills, built in 1893, produced one-half ton of sheets per hour. When partially mechanized in 1932 its output was doubled. In contrast to that, one modern continuous hot mill has produced over 260 tons an hour on the average during the course of a year.

(*From page 97*)

The bar folder is limited both as to the width of the edge which can be formed and the length of the sheet to be bent. Generally used for sheets of 22 gauge or lighter the bar folder is available in lengths from 20 to 36 in. It is a valuable production machine when there are a large number of similar bends to be made.

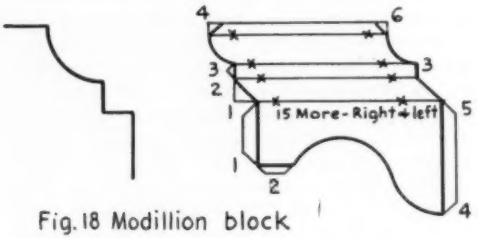


Fig. 18 Modillion block

Bends or folds of 45 or 90 deg can be made on the bar folder by setting standard stops. A gauge determines the width of the fold. After the sheet is inserted the hand lever is elevated until the stop is engaged and then released. In addition to the standard 45 and 90 deg stops, the bar folder is equipped with an adjustable collar which allows the folding of a range of angles extending beyond 90 deg.

To form a hem edge, make the maximum bend the bar folder will allow, take the sheet out of the folder and squeeze the edge together by closing the folder on it. For a double hem the operation is repeated. For a lock or hook seam, a sharp lock is made in each piece and the two pieces hooked together. To produce a double bend, the gauge must be set separately for each bend. It is also possible to regulate the wedge adjustment of the bar folder to make an open lock for a wire edge, as shown in Fig. 19.

As with all equipment in the shop, the bar folder should be kept clean and well lubricated. No metal heavier than specified by the manufacturer should be cut in the machine.

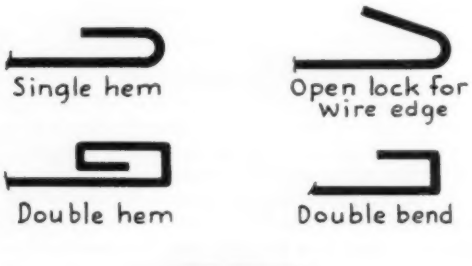


Fig. 19

The Bending Brake

The bending brake is more widely used than the bar folder because it is a more universal tool. The brake is not limited as to width of the edge that it can form and is built in lengths up to 12 ft for use in the sheet metal shop. Basically, the bending brake consists of two end frames to which are attached upper and lower clamping jaws to hold the metal in place. The bending leaf at the front of the machine swings up to make the bend or fold in the sheet.

Box and Pan Brake

The box and pan brake is similar in construction to the bending brake with the exception that the upper clamping jaw is composed of a number of sections, called fingers. A standard combination of these fingers consists of 3, 4, and 5 in. widths. By grouping these fingers, any length fold from the 3 in. dimension to the full length of the machine can be obtained. The box brake is most useful in making the bend on the last or fourth side of products such as outlet boxes, pans, etc. In many cases it is possible to make three bends in the bending brake and the final bend in the box brake, in order to keep all edges straight.

Abuses

Probably no other machine in the shop receives as much abuse as the bending brake. One of the greatest abuses is the use of a hammer to dress down corners, flatten locks, etc. This practice cannot be condemned too severely. A soft-faced mallet is the only proper tool to use around a brake. Another bad practice is bending wire or flat bars in the brake. Never attempt to bend two or more thicknesses of metal at one time or a heavier gauge than the manufacturer recommends.

Bending 18 or 16 gauge metal without attaching the reinforcing bar is another bad practice. The frame of the brake can be sprung quickly if the reinforcing bar is not used.

Adjustment

Correct adjustment of the upper jaw is essential to proper operation of the bending brake. There are two adjustments to be made, one for position of the jaw and the other for tension when closed. Adjusting set screws are located at each end of the brake to set the upper jaw in the proper place according to the thickness of the metal being bent. Tension can be varied by an adjustment located below the clamping handle at each end of the brake. This is important because the sheet will slip if there is not sufficient tension. The upper jaw will not close properly if the tension is too great.

(Next installment in the series will take up some operations with the bending brake—Ed.)

ANOTHER CASE OF *Copper where it Counts!*

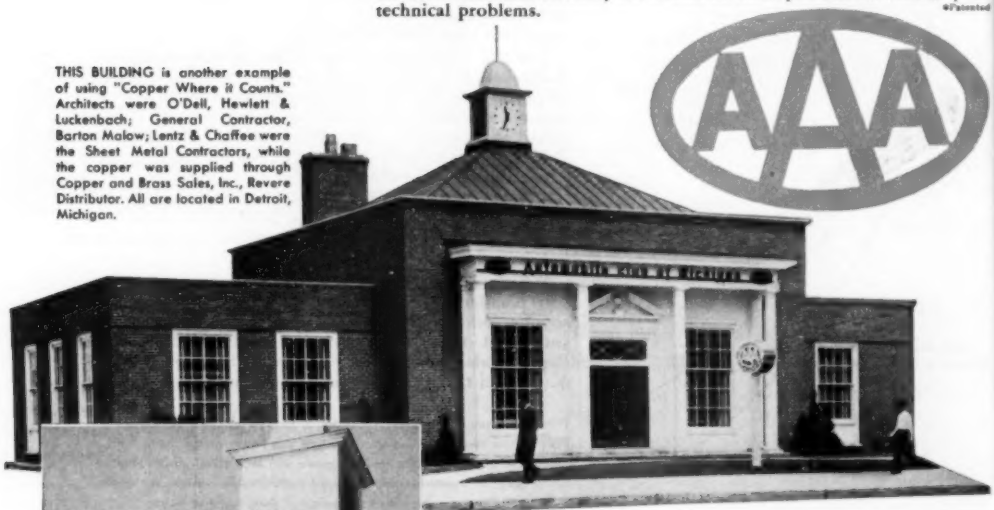
• Copper doesn't "happen" to be specified for roofs like the one on this building of the Automobile Club of Michigan. Copper gets the call over other materials because it has been proved, down through the centuries, that it endures, is easily worked, requires little if any maintenance and when aged adds a touch of distinction to the building it shelters.

While utility was the prime consideration for the material to be selected, for the central roof section, beauty of design and how it would look after years of service, also entered into the picture. For, this building was to be erected in a fine residential neighborhood and it couldn't be labeled "commercial." Copper filled these specifications.

Although copper cannot now be used for roofing, we use the Automobile Club of Michigan installation as a means of reminding you of the merits of Revere Copper over other materials so that when copper once more is permitted for roofing you will again use it, and with confidence. Meantime remember, while limited, you can still get Revere Sheet, Strip and Roll Copper for flashing. For through-wall applications ask the Revere Distributor about Revere Keystone Thru-Wall Flashing.* He also will advise you of the availability of materials and put you in touch with Revere's Technical Advisory Service in the event you wish to discuss your technical problems.

*Patented

THIS BUILDING is another example of using "Copper Where it Counts." Architects were O'Dell, Hewlett & Luckenbach; General Contractor, Barton Malow; Lentz & Chaffee were the Sheet Metal Contractors, while the copper was supplied through Copper and Brass Sales, Inc., Revere Distributor. All are located in Detroit, Michigan.



ABOVE CLOSE-UP of the central roof section of the building housing the Automobile Club of Michigan, Grosse Pointe Park Division, shows how enduring Revere Copper was applied.

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Here's an example. When TYPE A is not immediately available, TYPE Z will be found to be an excellent substitute for light gauge sheet metal and can also be used in heavy sheet metal.

P-K Assembly Engineers are ready to help you in every way possible to adjust your contract work to limited supplies, and apply the long experience of Parker-Kalon to your most difficult problems of planning and procurement. Parker-Kalon Corporation, 200 Varick St., New York 14, N. Y. Sold through Accredited Distributors.

TYPE A — the original Sheet Metal Screw, for light gauge sheet metal.
TYPE Z — a thread-forming screw for light and heavy gauge sheet metal, non-ferrous castings, plastics, etc. Also made with **HEX HEAD**, suitable in heavier sizes for structural steel. Hardened **SCREWNAIL** — drives like a nail . . . holds like a screw, for secure fastenings of sheet metal to wood. Hardened **MASONRY NAIL** — for fastenings to brick, concrete and other masonry; simpler to use, costs less than comparable devices.

*TRADE MARKS REG. U.S. PAT. OFF.

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Canadian Chapter

THE CANADIAN CHAPTER of the National Warm Air Heating and Air Conditioning Association is well on its way with this year's educational program — the third and fourth schools of the 1951 schedule being held in Windsor, Ontario, (January 29th to February 2nd) and London, Ontario, (February 5th to February 9th).

Twenty-seven students attended the Windsor school where John G. Burnet was local chairman. A. G. Salmon, a member of the Technical Advisory Committee, assisted T. A. Clark of the association's staff with the lectures.

The London school, held at the Catholic Culture Centre on Colborne Street, saw a large attendance of 77. Bob Corrin of W. A. Stacey & Co. was chairman of a very active committee with members as follows: Lloyd Brown; Barney Hessey; Keith Arnold; Jack Hamilton and George Stevens.

Lloyd Brown on publicity did an outstanding promotional job. An entire page was taken in the London Free Press issue of Feb. 8th. A number of local contractors bought advertising space.

COMING EVENTS

April 30-May 2—Sheet Metal Contractors' National Association, Annual Convention, Broadmoor Hotel, Colorado Springs, Colo. J. D. Wilder, Executive Secretary, 170 Division St., Elgin, Ill.

May 27-29—National Heating Wholesalers' Association, Summer Meeting, The Greenbriar, White Sulphur Springs, W. Va., E. L. Wyman, Executive Secretary, 609 Union Commerce Bldg., Cleveland 14, Ohio.

Indoor Comfort Conferences

April 26-27—Rockford, Illinois
E. D. Mott, Mott Bros., 907 South Main St.

April. 30-May 1—Milwaukee, Wisconsin
Fred J. Engler, Milwaukee Stove & Furnace Repair Co., 323 West Juneau Ave.

May 3-4—Minneapolis, Minnesota
Stuart A. Smith, Waterman-Waterbury Co., 1121 Jackson St., N. E.

May 7-8—Billings, Montana
Harry Hunt, Midland Implement Co., Heating Division

May 11-12—Omaha, Nebraska
L. C. Norton, A. Y. McDonald Mfg. Co., 1201 Dodge St.

May 14-15—Des Moines, Iowa
John C. Rehmann, Keith Furnace Co., Dean Ave. at E. 26th St.

May 21-22—Evansville, Indiana
George Saum, Plumbing and Industrial Supply Co., Inc.

May 25-26—Fort Wayne, Indiana
Cleo. G. Fox, Fort Wayne Heating & Sheet Metal Contractors Ass'n., 3209 Thompson Ave.

May 28-29—Detroit, Michigan
E. B. Root, Superior Safety Furnace Pipe Co., 5816-44 Forsythe Ave.

May 31-June 1—Bay City, Michigan
B. L. Lange, Wm. A. Lange & Son, 219-221 So. Hamilton St.

June 4-5—Kalamazoo, Michigan
Glen W. Rynbrand, Glen W. Rynbrand Co., 2107 Schippers Lane

June 21-22—Utica, New York
I. C. Barber, International Heater Co., 101 Park Ave.

The registration fee for the two-day conference is $12.50 per student. The fee includes tuition and the cost of all manuals and worksheets that the student will receive for classroom instruction. For further information regarding class location and hotel room reservation, write to the chairman of the conference you plan to attend.

Ohio Association Discusses Metals & Controls

THE CITY OF COLUMBUS welcomed the members of the Ohio State Sheet Metal Contractors Association on the morning of Monday, March 5, as they opened their 37th annual convention. Meetings were held in the Deshler-Wallick Hotel and topics of importance in today's rapidly changing industrial picture were scheduled for discussion.

Robert Spragg, president of the group, opened the first formal session Monday afternoon. He introduced R. C. Mader, Cleveland, who spoke on building prospects for 1951 and credit buying.

Building in 1951

Mr. Mader indicated that the building credit organization which he represents has attempted to discover the potential volume of residential construction for 1951 and finds that it should continue at a high level. In the face of increasing shortages and credit restrictions no one expects a year like 1950, but 1951 may see the construction of close to a million new homes.

The message for the warm air heating industry in this potential is apparent. If homes are to be built, they must be heated and warm air is the preferred method of heating. It also follows that if the government permits use of materials for home construction, some provision must be made for materials for heating systems.

Another important phase of Mr. Mader's talk was the importance of credit selling of heating systems in any period of hard selling. He pointed out that the *Indoor Comfort* dealer is competing against the automobile and television dealer as well as against another heating dealer. The consumer dollar will stretch only so far and it may not cover payments for a car, television set, and a heating plant. It is very important that the heating dealer be able to offer the same type of easy credit that can be obtained from the television dealer.

Next speaker was Harry Ballman, smoke control head of the city of Columbus. Mr. Ballman gave some of the history of smoke control in general and its particular history in the city of Columbus. Without branching into the technical phases of the subject he told some of the problems faced by a smoke control department and how those problems had been met in Columbus. The use of before and after slides to show the cleaner atmosphere of the city was very effective.

The convention was treated to a buffet dinner and floor show in the evening, under the auspices of the sales auxiliary.

The morning session on Tuesday, March 6, began with a speech by Clarence Grandstaff, Elyria, on the topic of heating basementless houses. He traced the development of the popularity of the basementless house in the colder climates of the country and the accompanying problem of heating this house satisfactorily.

Mr. Grandstaff presented floor plans and discussed perimeter warm air heating systems which have been tested by the National Warm Air Heating and Air Conditioning Association and found to be very effective. He brought the news that one particular type of crawl space heating system has been approved by the Federal Housing Administration in Cleveland. This is a valuable alternative where a concrete slab floor is not desired or cannot be used. The speaker also mentioned that in some cases non-metallic ducts are being installed in perimeter warm air heating systems.

Seated, left to right: Clarence Christen, Toledo, treasurer; Wm. Lumm, Toledo, secretary; W. E. Bogen, Columbus, president; Wm. Orton, Akron, vice president. Standing: Philip Young, Cincinnati, director; Robert Spragg, Columbus, immediate past president; J. Jacobson, Cincinnati, director; Mike Cutter, Cleveland, director; H. Fahnle, Cincinnati, director.

Robert M. Nelson, Middletown, was next on the program and brought a discussion of market outlook and the control picture as it affects the warm air heating and sheet metal contractor. He said that prospects for furnace production at a relatively high level seemed good. He summarized the controls which have been placed on availability and use of galvanized sheets, aluminum, copper, and other metals and said that all indications are that a controlled materials allocation plan will be put into effect as functioned druring the last war. The revival of this plan could be of great benefit to the industry, because if metal supplies are allocated on a basis of importance of the industry then warm air heating will not be neglected. If partial controls are continued the present supply picture could become steadily worse.

Cooperation Asked

The afternoon session was led off by E. L. Wyman, executive secretary, National Heating Wholesalers Association, who talked about the current status of our nation's capital.

Mr. Wyman discussed the actions that have been taken in the matter of control and distribution of metals required by the warm air heating and sheet metal industry. He then developed an interesting theory. He said that the men who have been placed in charge of regulating this industry are men who have some familiarity with it. But he pointed out that if the people in the industry refused to cooperate and comply with the controls promulgated there would be serious results. If these men who are sympathetic to the industry become disgusted with the lack of cooperation they get, they might leave Washington and leave openings for doctrinaire bureaucrats whose ideas of controlling our industry could lead to disaster. As a result he advocated cooperation and put the responsibility for the success of the control program on the doorstep of the contractor and other members of the industry.

Wilbur Collins, Columbus, manager of the local utility spoke on gas availability for 1951. His message was brief and blunt, from all indications there would be no more gas available for new installations this year. He discussed the pipelines under construction or in the planning stage but wound up at the same theme — no more gas.

J. D. Wilder, Elgin, Ill., executive secretary, Sheet Metal Contractors' National Association, came next on the program to discuss the defense program and material supplies. Mr. Wilder brought out the importance of concerted action in regard to any regulations that tend to cause dislocations in an industry. The value of this type of action was described in reference to the copper control order, M-12. As amended it stated that any copper had to be in the process of manufacture before March 1, 1951 and completed before April 1, 1951, if it was to be installed legally. This made no provision for copper in inventory which had been purchased for a specific job but could not be processed because measurements would not be available until after April 1. The SMCNA began a campaign of writing to those in authority in the National Production Authority and the NPA got so many excellent letters explaining copper difficulties that the order was changed to allow use of inventory.

At the banquet

Final speaker was W. A. Wiedenmann, Kansas City, president, SMCNA, who told of some of the varied activities of the association in the past few years.

Wisconsin Group Gets Education, Recreation

Business subjects of the day proved to be a magnet that drew contractors to Milwaukee for the Wisconsin convention. The program was designed to allow time for the hospitality for which this state is noted, however.

THE 33RD ANNUAL CONVENTION of the Sheet Metal Contractors Association of Wisconsin held in Hotel Schroeder, Milwaukee, February 12-14, featured a full slate of subjects that held the interest of its members. Several hours devoted to a detailed and illustrated discussion on the hazards from improperly venting gas fired heating appliances focused the attention of the delegates on correct installation practices for this type of equipment. Release and public acceptance of natural gas for heating in southern Wisconsin communities contributed to the timeliness and interest in the presentation.

Business subjects, reports by officers of the Sheet Metal Contractors National Association, and social activities consisting of Wisconsin's famous hospitality hour, a ladies program, and a banquet provided sober and recreational diversion for the delegates during the three day event.

Remember the Worker

President Henry J. Ortwig introduced George A. Habermann, president, the Wisconsin State Federation of Labor, who appealed for recognition of the employee's stake in business enterprise. He reminded his listeners that new employees are usually not familiar with the needs of a particular business and often are not advised about management problems, yet the security of a business is in the hands of all persons on the payroll. He advocated that employees should be encouraged to participate in management and suggested that employers participate in labor problems so both can adopt coordinated business-labor programs.

Get Cooperation

Mr. Habermann cited cooperative efforts by the state federation which contribute to the quality of products and insure security of sales and jobs. In his opinion, employees are interested in the success of an establishment and suggested a cooperative attack to many business problems. As an example, he cited the problem of a low bid. Ask the employee, he said, how the job can be done without loss. He is interested and often can come up with a solution because he wants continuous employment and wants to see the business succeed.

Follow Instructions

Idwal Parri, field educational director, Perfex Corp., said he wished he could take his audience into the return goods department of a control manufacturer so it could see the volume of equipment returned because it is presumed to be defective. He said the situation points to the need of an educational program by manufacturers to acquaint the industry on the function of each control in common use. He urged that instruction sheets accompanying all controls be read carefully as it contains hints on operation and installation that should be followed. The speaker made several valuable suggestions on insuring proper operation of controls, such as wiping metal chips off contact with friction tape, careful han-

Frank Kramer — W. A. Wiedenmann — J. D. Wilder — C. E. Blome

Hosts for hospitality.

dling in the field to prevent damage to delicate parts, and keeping packages intact to protect sensitive contacts from dust.

Mr. Parri recommended that one man in an organization should be fully informed on the functioning of controls and observed that a thorough knowledge of one control will contribute to an understanding of the operation of all controls.

Condensation Problems

C. E. Blome, consulting engineer, William Wallace Co., demonstrated with props and illustrations that condensation is a product in the combustion of natural gas that cannot be disregarded. He said 11 gallons of water are formed from burning 1,000 cubic feet of gas and drove home the consequences of improper venting with illustrations that were convincing. This was evident from the active participation in a question and answer period following his presentation.

W. A. Wiedenmann, president of SMCNA, was introduced as the first speaker at the Tuesday afternoon session which was set aside as National Day. Mr. Wiedenmann reported on the problems facing the industry as mobilization gets underway and pointed to the continuous need for a voice in national affairs. He was followed by J. D. Wilder, executive secretary of SMCNA, who reviewed the limitation orders which restrict the use of essential metals used by the industry. He stated that the present defense program is based on a 10 year period of war production at the expense of the civilian economy and hazarded the guess that if a shooting war is not started by 1953, more materials will be available for civilian use at that time.

Wednesday's business sessions were restricted to members only and consisted of reports by chairmen of standing committees and election of officers and directors.

1951 Officers

President	Henry J. Ortwig, Racine
1st Vice President	Bernard Zahn, La Crosse
2nd Vice President	Charles W. Warning, Jr., Oshkosh
Secretary	Arthur Mantei, Sr., Milwaukee
Treasurer	Frank Kramer, Milwaukee
Sergeant-at-arms	Lyle W. O'Leary, Milwaukee
Executive secretary	Irv. F. Kanitz, Milwaukee

Directors (3 year term)

Vincent J. Kerscher	Manitowoc
Arnold Holming	Milwaukee

Forums And Control Discussions Feature New York Convention

THE 28th ANNUAL convention of the New York State Sheet Metal Roofing and Air Conditioning Contractors' Association was called to order on Monday morning, March 12. Scene of the affair was the Hotel Utica, Utica, N. Y. William Steinhorst of that city was chairman of the convention committee and he opened the meeting by welcoming the group and then introduced Asaph Hall, Elmira, president of the association, who gave his report on his term of office.

Mr. Hall began by reviewing the events of the past year and their effect on the warm air heating and sheet metal industry. He stated that this industry should do everything possible for national defense and still keep roofs and heating equipment in good repair on the home front. Mr. Hall then appointed the various committees which were to function during the convention. He then introduced Leo B. Sherry, Utica, president of the Merchandisers, who added his greetings to the city and invited

the contractors to the buffet supper sponsored by the sales auxiliary.

Report On Insurance Group

The next speaker on the program was of great interest to all association members. Donald B. Hayes, president of Laverack and Haines, insurance group managers for the New York association reported on the operation of the group during the past year. He brought out the fact that expenses are going up because of the liberality of awards of referees and juries deciding on workmen's compensation cases. This trend can be opposed only indirectly by such means as reducing the frequency rate of accidents in the shop or on the job.

The subject of safety was then treated by Alfred Hoftiezer, also of Laverack and Haines. Mr. Hoftiezer presented a number of slides which showed causes of accidents. Ladders were the most frequent source of injury for the workman and some of the slides showed some incredibly bad ladders.

Controls

The afternoon session of the convention was under the chairmanship of Harry C. Gilbert, Buffalo. Principal speaker was J. D. Wilder, Elgin, Ill., executive secretary, Sheet Metal Contractors' National Association.

Mr. Wilder spoke on the subject of controls and regulations affecting the warm air heating and sheet metal industry. This discussion proceeded smoothly until the subject of copper came up. It then became apparent that there must be a great deal of copper in inventory in the Empire state, because all the contractors present wanted to know whether they could use copper in inventory. Order M-12 had originally banned use of copper after May 1, but a change was made to allow the utilization of inventories after that date. No restrictions have been placed on the use of copper for flashings.

Feature of the evening entertainment was a kangaroo court presided over by "Judge" Jack Stoner. Some unusual punishments were meted out.

Sheet Metal Forum

Tuesday morning, March 13, was devoted to a forum on roofing and sheet metal work. William J. Schmitt, Rochester, acted as chairman of this session. He opened the discussion by telling some of his own experiences in the roofing business and other incidents were related from the floor.

Joseph Stiglmeier, Buffalo, gave a talk on outside sheet metal work and revealed the secrets of his success in getting cooperation with construction crews.

John J. Yager, also of Buffalo, spoke on outside sheet metal work, describing some of the great variety of work that is included in that category.

Last speaker of the morning session was H. E. Voegeli, Waterbury, Conn., who talked about copper roofing and its history. After discussing application techniques, the speaker presented a very fine color film which showed the re-roofing with copper of the Minneapolis city hall and the Commercial Museum, Philadelphia.

Warm Air Meeting

A warm air heating forum was held in the afternoon with Richard Friday and Irving Spalty of Rochester, as co-chairmen.

Opening speaker was William Gillette, Rochester, who discussed radiant heating, floor and ceiling.

C. M. toe Laer, Bloomfield, N. J., described a new high velocity system of warm air heating which is designed to discharge warm air at the outside walls. He gave the history of the development of this system and told how its installation has been simplified.

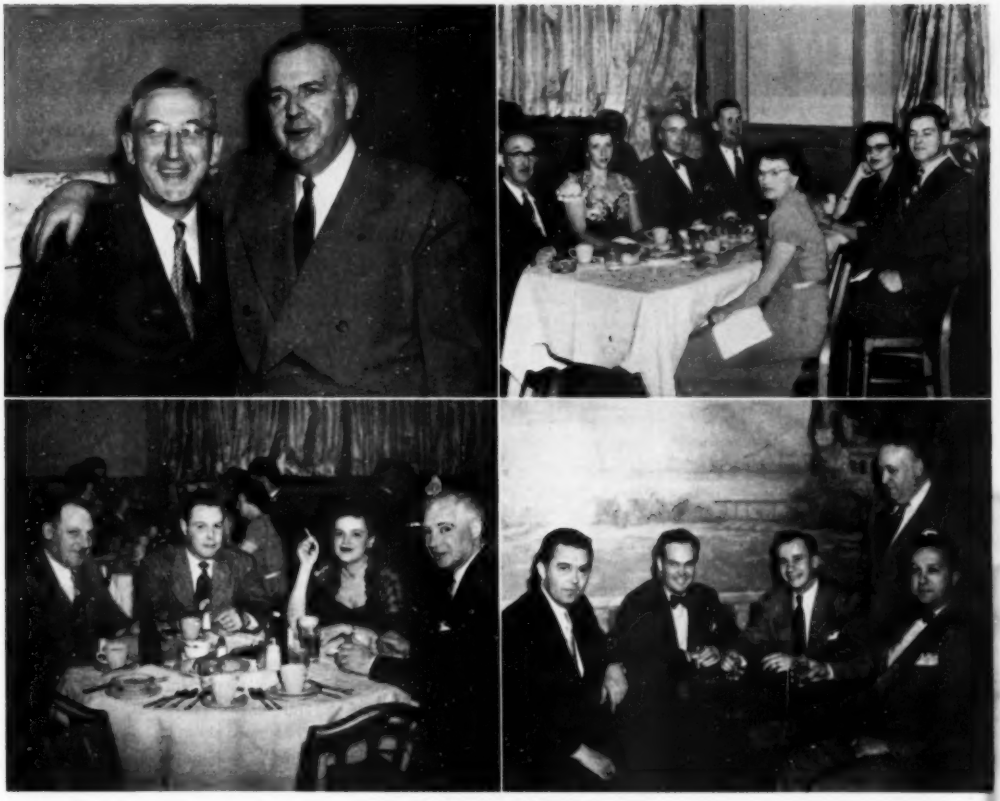
Paying Salesmen

Last speaker of the afternoon was popular Dan Schmidlin, heating contractor from Toledo, Ohio, who told how his firm compensates salesmen.

He outlined a plan of paying for surveys, presentations and demonstrations that allows the salesman to determine his own income. The fees paid for the surveys, etc., are charged against commissions so the operation of the plan is quite simple. Mr. Schmidlin offered sales figures and salesmen's earnings to back up his statements about the effectiveness of this sales plan. His interested audience had many questions for Mr. Schmidlin.

Wednesday morning, March 14, was taken up with the business meeting of the association, reports of committees and election of officers.

Officers and directors



At the annual banquet

1951 Officers

President ..... William C. Steinhorst, Utica
1st Vice President ..... Harry C. Gilbert, Buffalo
2nd Vice President .... Richard W. Friday, Rochester
Executive Secretary ..... Clarence Meyer, Buffalo
Treasurer ..... William C. Kirkpatrick, Buffalo

Directors

Joseph Cashier ..... Syracuse
Charles R. Joyce, Jr. ..... Albany
Richard B. Millard ..... Scotia
F. Van Pils ..... Lockport
Percy Sullivan ..... Binghamton
Irving G. Spalty ..... Rochester
Stanley Bates ..... Rome
Thomas Zacaroli ..... Utica
William G. Schmitt, Jr. ..... Rochester

The Merchandisers

President ..... H. C. Scritchfield
1st Vice President ..... T. E. O'Neal
2nd Vice President ..... R. W. Mackey, Jr.
Secretary ..... J. J. O'Donnell
Treasurer ..... J. P. Cullin
Sergeant at Arms ..... G. G. Rawlings

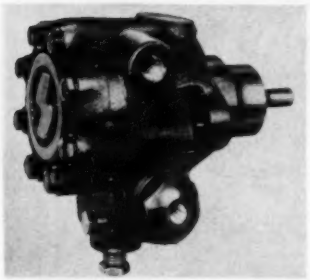
Directors

Leo B. Sherry — David Levow
J. W. Thompson — T. W. Sachs

Zone Delegates

F. O. Carfer ..... Buffalo
F. C. Laubenheimer ..... Rochester
G. W. Miller ..... Syracuse
I. W. Gilbert ..... Utica
A. A. Stagg ..... Albany
Herbert Northrup ..... Binghamton

EQUIPMENT DEVELOPMENTS



Fuel Units 39

New single and two stage fuel pump models have been provided with interchangeable mountings that permit them to be used as replacements for practically all of the manufacturer's units in the field. With just two models in stock, a dealer has both stages available for installations with firing rates up to 20 gph.

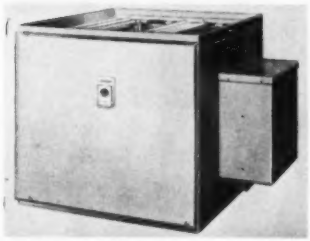
Strainers are of sufficient capacity for maximum firing rate. They are improved construction, can be readily removed and installed without removing the pump from the burner, and are positive in seating.

A reduction of pump noise has been accomplished with a new anti-

(Use Coupon on Opposite Page)

hum diaphragm and hydraulically sealed pumping members.

Pressure regulating valves are quickly adjusted for a pressure range from 75 to 150 psi and are designed for easy servicing and replacement.
Sundstrand Machine Tool Co., Rockford, Ill.



Air Cleaner 41

This electronic dry type air cleaner removes dust and dirt from the air by electrical attraction and is installed in the return duct of any forced air heating or cooling system. Made in sizes to meet all residential installation requirements, the filter offers the ultimate in completely dust free air in the home because it traps particles of dust and dirt as small as one hundred thousandth of an inch in diameter.

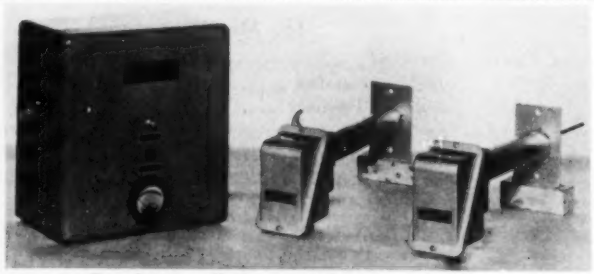
The filter removes pollen, airborne bacteria, and other microscopic particles, as well as fine dust or smoke causing grime or smudge on walls and furnishings. Filter cells in its collector element will continue to clean the air if the electrostatic action is interrupted.

The electrostatic action is produced by a power pack similar to the power units in radio and television sets. It steps up the regular 110 v lighting current to a higher potential and changes it, with rectifier tubes, from alternating to direct current.

This current is then applied to the filter cells through metal grids, producing a strong electrostatic field that attracts and holds dust, dirt, and smoke particles in the filters. Consumes about as much electricity as a 25 watt bulb. The unit requires no water or drainage connections.

Installed directly in the return duct either vertically or horizontally according to the position of the duct.

Made in seven sizes, having two to eight filter cells, with an air volume up to 600 cfm for the smallest size, and from 2,100 to 2,400 cfm for the largest. These sizes are applied to heating units rated up to 64,800 Btu at the register for the smallest size, and to 259,000 Btu for the largest. Multiple units are used for installations requiring larger air volume.
American Radiator and Standard Sanitary Corp., Pittsburgh, Pa.



Electronic Combustion Safeguard System 40

A new electronic combustion safeguard system for commercial oil burners provides immediate cutoff of fuel in case of failure. Equipment includes a switch-amplifier-contactor unit, phototube holder, and electrode holder.

The system assures positive protection against combustion failure because 1) if the gas pilot does not ignite, the oil valve canot open, and 2) if the oil flame does not ignite, the supply of fuel is cut off. After the cutoff, the motor continues to operate for 30 seconds to purge the nozzle or cup of unburned fuel to prevent carbonizing and reduce field servicing. System is then locked against further operation until manually reset.
General Electric Co., Schenectady, N. Y.

Compact Toggle Clamp . 42

A compact new plier type toggle clamp is particularly suitable for

sheet metal and body work and for holding metal, wood, or plastic parts during machining, welding, and cementing operations. Provides positive holding pressure with a firm toggle locking action. Light weight, only 5 oz, makes it ideal for one hand use, while extreme compactness (overall length 4½ in.) allows use in restricted working area. Handles and jaws are forged high alloy steel, bearing pins are stainless steel.

Detroit Stamping Co., Detroit, Mich.

LP Gas Fire Pot 43

A new LP gas fire pot is extremely versatile in its operations through the use of adapters available as accessories. It can be operated on top of a 20 lb cylinder or as a bench unit off of a gas cylinder. Or, the lead melting assembly may be used with any commercial LP cylinder now in use. The standard LP cylinder furnished with the assembly can be refilled by any LP gas dealer or distributor.

Clayton & Lambert Mfg. Co., Louisville, Ky.

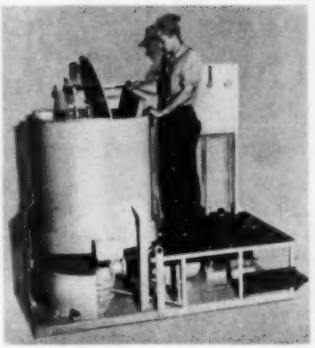
Air Velocity Meter 44

New Agitair Meter battery powered air velocity measuring instrument is especially designed for heating, ventilating, and air conditioning engineers.

Based on the hot thermopile principle, the instrument gives accurate instantaneous measurement of air velocities as low as 5 fpm and as high as 4,000 fpm, with static pressure readings from 0 to 4 in. water gauge.

Instrument is compact and light in weight, can easily be carried from site to site.

Air Devices, Inc., New York, N. Y.



Air Filter Washer 45

An air filter washer-oiler offers widespread application as a time and labor saving method for cleaning air filter elements in large buildings, hospitals, mills, refrigeration plants, and other places having air conditioning or ventilating systems using permanent type filters.

One man working at a normal rate of speed can clean 600 or more 19½ x 19½ x 2⅛ in. air filters in an eight hour day.

Machine works on the principle of centrifugal force. Filters spin in the interior basket of the machine at a relatively high speed during the complete cleaning and oiling cycle so that they are thoroughly washed, rinsed, spun dry, and oiled all in one continuous operation.

Machine occupies a small floor area, only 6 ft 10 in. x 4 ft 4 in., can be conveniently installed in an out-of-the-way location where it will not interfere with regular working operation.

Paxton-Mitchell Co., Omaha, Nebr.

Ceiling Outlet 46

A new square ceiling outlet is designed and sized to match standard acoustical tile and blends with the ceiling pattern. Another model of the same outlet has a surface flange making it suitable for installation in plaster ceilings. A feature of this outlet is that the air supply can be adjusted from vertical to horizontal after installation and can be set to discharge air in one, two, or three directions or to provide full 360 deg distribution. None of these adjustments in any way alters the outward appearance of the unit and, without modification, it can be used as a return air opening.

Barber-Colman Co., Rockford, Ill.

MAIL THIS NOW!

We will ask the manufacturer to send full particulars about the products and literature mentioned.

Be sure to circle the items you want. 4-51

Equipment Developments

39 40 41 42 43 44 45 46

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245

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Modern, well equipped
Service School Laboratory

Time and equipment for
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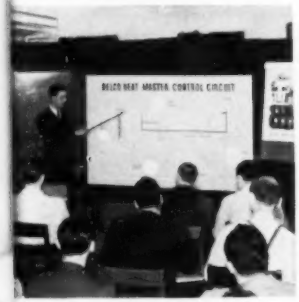


Classroom presentation of theory by
men with practical experience

Men who know their business...

Delco-Heat Service Schools produce Delco-Heat experts

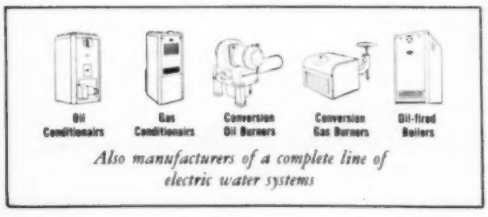
A continuing program of factory training schools—teaching all phases of servicing and installing gas and oil units, and estimating for all types of heating systems—is conducted in the Rochester plant of Delco Appliance Division of General Motors.

Out of these training sessions will come men who *know their business* . . . who can install and service Delco-Heat units more efficiently, and who can sell Delco-Heat products with the confidence that comes of knowledge.

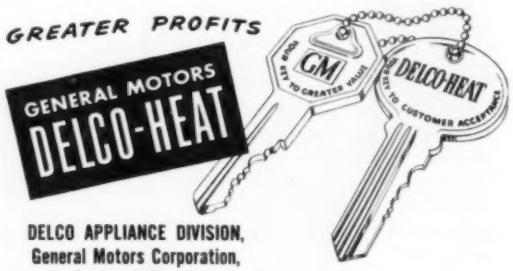
The schools save time and money for Delco-Heat Retail Distributors. The training is well-organized and concentrated, and the most comprehensive course requires only two weeks. Thus the "students" are away from their home organizations for only a short time, and on their return they are capable of more productive, more efficient work for their employers.

Top quality products, competitive prices—plus services like the factory training schools—give the Delco-Heat Retail Distributor a real opportunity to build a profitable business.

YOUR KEYS TO GREATER PROFITS

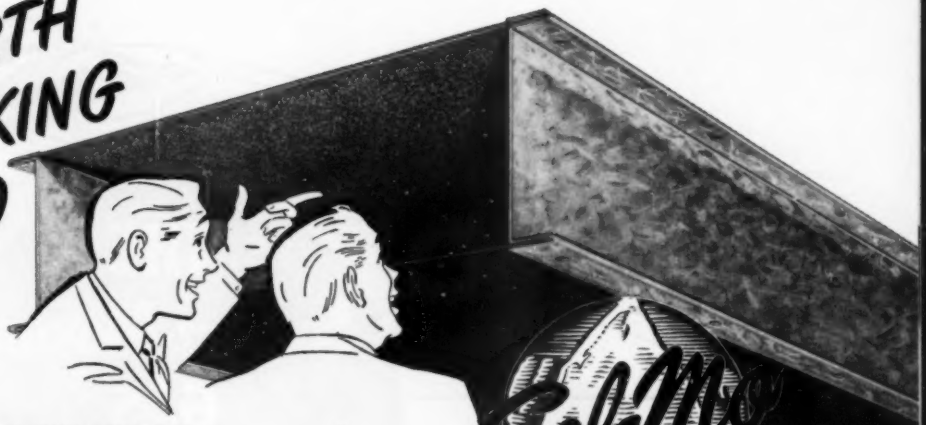


Also manufacturers of a complete line of electric water systems



DELCO APPLIANCE DIVISION,
General Motors Corporation,
Rochester 1, New York.

WORTH LOOKING INTO

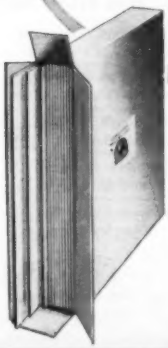


FOR YOUR NEXT HEATING, VENTILATING OR AIR-CONDITIONING JOB

Sal-Mo ASBESTOS DUCTBOARD

This time-tested material saves up to two-thirds of the metal required for duct work on most jobs of heating, ventilating or air-conditioning—saves on installation cost, too. Has been accepted for use in Federal Housing Authority insured properties.

INTRODUCED ten years ago and now greatly improved, Sal-Mo No. 77 Asbestos Ductboard is a solid asbestos sheet, developed and manufactured by Sall Mountain Company for the construction of both warm and cold air ducts. For greatest economy of materials and labor, side rails of the warm air ducts are made of metal, the tops and bottoms of Sal-Mo Ductboard. The cold air ducts are formed by the simple method of nailing or stapling Ductboard to the joists. Sal-Mo Ductboard is easily handled, easy to install. It comes in sheets 33" x 48", just the right size for covering two joist openings spaced at 16" centers.



CONVENIENTLY PACKED 16 SHEETS TO THE CARTON

FIREPROOF — MOISTURE-PROOF

Sal-Mo No. 77 Ductboard is made of solid asbestos, the product of our own mines in Canada. Exhaustive laboratory tests show that it will resist fire up to a temperature of 1,000 degrees, Fahrenheit. It is scientifically treated against moisture absorption. Will not rust.

ABSORBS SOUND

This is a feature which every home owner will appreciate. Noises which are caused by expansion and contraction so prevalent in all-metal ducts are practically eliminated by the use of Sal-Mo Ductboard. But this is not the only advantage. In any all-metal duct, the sound of the forced air from the fan or blower is magnified. Sal Mo Ductboard absorbs much of this sound.

Your jobber has or will soon have Sal-Mo Ductboard in stock.

SALL MOUNTAIN COMPANY

MILL AND OFFICE AT HAMILTON, OHIO

OTHER SAL-MO ASBESTOS PRODUCTS: Paper • Millboard • Rollboard • Corrugated Air-Cell Paper • Pipe Joint Tape • Cloth • Gaskets • Air-Cell Pipe Coverings and Sheets Range Boiler Jackets • Furnace and Boiler Jackets • Rope and Wick Packings • Wool and Sponge Felts

Rheem

THE Fastest-Moving GAS Heating Line in AMERICA!

✓ Easiest to Sell
✓ Easiest to Handle
✓ Easiest to Install

THESE HARD FACTS CAN ADD UP TO REAL CASH FOR YOU

1 Rheem makes a *complete* line of gas furnaces offering highboys in both front vent and rear vent models. You can get the unit you want for *any* situation.

2 Rheem furnaces are fully assembled, PRE-TESTED, and packaged at the factory. You save time. You KNOW they're in operating order.

3 Rheem packaged furnaces are delivered to you FULLY WIRED, with all controls built in.

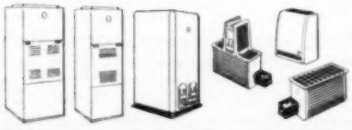
4 The Rheem line is the most COMPACT ever made. New *space-saving* sizes simplify placement for you—save builders valuable floor space.

5 Rheem offers advanced *style* as well as performance. Eye-appealing, money-making cabinet design —backed by national advertising.

Why Rheem Furnaces are the quietest ever built

←**Exclusive "FLAME-FIT" Heat Exchanger.** The Rheem combustion chamber is curved to fit the contour of flame. This advanced design feature permits hot gases to completely wipe the sides of the chamber, eliminating hot spots and expansion and contraction noises.

Unique "ANGLE-FLOW" Burner. Another Rheem innovation! Burner is scientifically tilted to better distribute heat→ and minimize noise.



Get Your Share of Rheem's Skyrocketing Warm Air Gas Business. Don't Wait. Call, Write or Wire Your Heating Wholesaler or Your Nearest Rheem Regional Office RIGHT NOW!

4361 Firestone Boulevard
South Gate, California

1025 Lockwood Drive
Houston 20, Texas

7600 South Kedzie
Chicago 29, Illinois

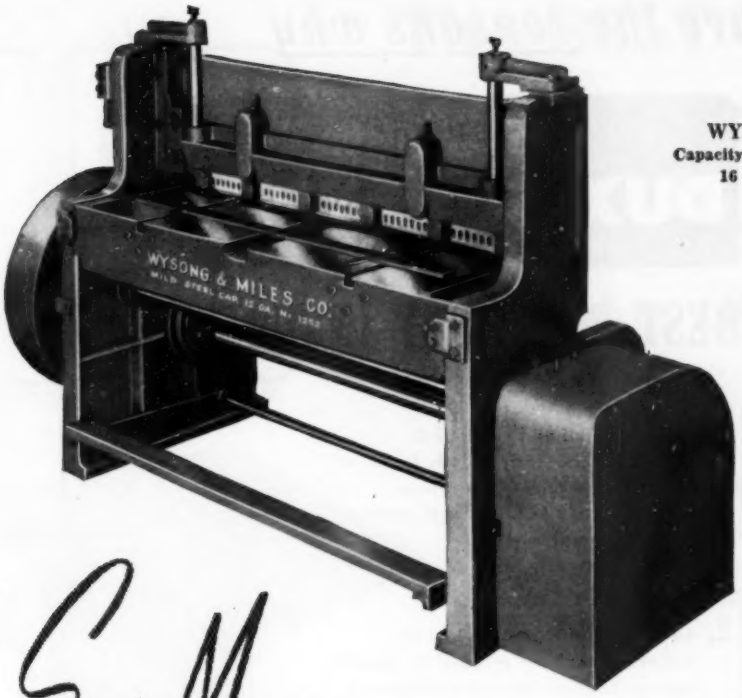
29-28 41st Avenue
Long Island City 1, N. Y.

Sparrows Point 19,
Maryland

Guaranteed by Good Housekeeping

Rheem Manufacturing Company

570 Lexington Avenue, New York 22, N. Y.



WYSONG No. 1252
Capacity: 52", 12 ga., mild steel. 16 ga., stainless steel.

Save Money WITH WYSONG'S 12 GAUGE SERIES

If most of the sheets you shear are 12 gauge or less, you now can get an economical 12 gauge shear to meet your requirements.

To insure top performance at a 12 gauge rating, Wysong 12 gauge series are all tested at the factory on *10 gauge* sheets. Made in 52-inch, 6 foot, 8 foot and 10 foot cutting lengths, one of these economical shears meets the full shearing requirements of most sheet metal shops.

STANDARD EQUIPMENT INCLUDES . . . Motor with controls and electrical equipment; ball bearing, precision Back-Gauge; embedded, adjustable, stainless steel Scale; slotted metal Finger Guard; Non-Repeat Unit; and 4-edge Blades.

Rigid Wysong *Hi-Tensile* Casting construction is combined with time saving features to give speed and accuracy in operation, plus many years of satisfactory service.

Each Wysong shear is tested for 24-hours of operation before leaving the factory and is shipped *completely equipped* and ready for continuous operation.

THE WYSONG 12 GAUGE SERIES

No. 1252 . . . 52 inch cutting length
No. 1272 . . . 6 feet cutting length
No. 1296 . . . 8 feet cutting length
No. 1210 . . . 10 feet cutting length

Wysong builds a complete line of Air, Foot and Motor powered squaring shears for the Sheet Metal Shop. See your dealer or write for Catalog No. 44.

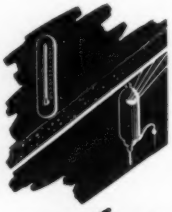
WYSONG and MILES Co.
GREENSBORO, NORTH CAROLINA

...here are the reasons why

Grant Wilson DUX-SULATION

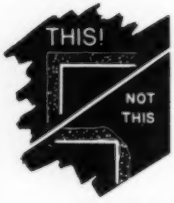
(ASBESTOS PROTECTED)

is BEST FOR DUCT INSULATION



1. High thermal and acoustical insulating properties . . . K factor of .27 BTU and sound absorption approximately 61%. Integral, woven asbestos membrane.

2. Easy to handle, easy to install *correctly*, can't be crushed or cracked, springs back to original thickness if compressed. Supplied with special glue and tape, no "fasteners" needed.



3. Constant insulating values. Can't "powder", shift or sift; no thin spots, even at corners. No deterioration of any kind, no *change* of any kind.

4. Perfect adhesion, flexible, conforms to uneven surfaces. Tough enough to be installed in the shop and still withstand all necessary handling. Not just "adapted" for duct work, but specifically engineered for duct application ONLY!

Inspect Dux-Sulation yourself!

Write Grant Wilson, Inc. 141 W. Jackson Blvd., Chicago 4, Illinois. Ask for Sample Kit No. 534-A.

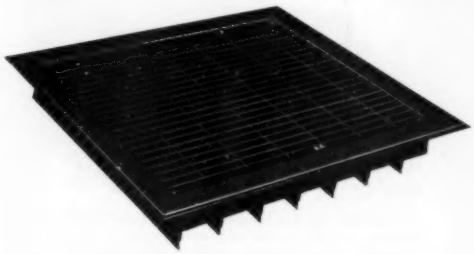
Grant Wilson inc.

ASBESTOS and INSULATING MATERIALS

IN NEW YORK CITY: Air Conditioning Utilities Co., 8 West 40th Street, New York 18, N. Y., LOngacre 3-4280.
IN CANADA: Atlas Asbestos Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver.

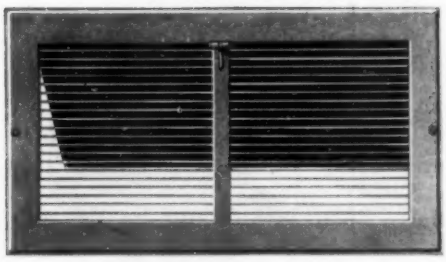
The BEST "BUY" In REGISTERS

The Finest and Most Complete LINES



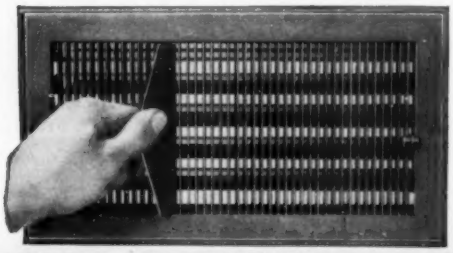
NEW No. 400 Floor Register

The New No. 400 Floor Register Close Space 7/16 x 1-15/16 Has no Equal in Strength, Operation and Finish. No. 405 Steel Faces to match No. 400 Floor Registers.



No. 153 Air-Conditioning Register

The No. 153 Air Conditioning Register (not a mere stamping) is a splendid example of perfect workmanship in development of the Best Single Valve Non-Vision Type of A.C. Register made. Compare it with any other Single Valve A.C. Register.



No. 256 4-Way Flow A-C Register

The No. 256 — By a Wide Margin — Leads the Field as the Best Made and most flexible Type of Multi-Valve 4-Way Flow Air Conditioning Register on the market. Also compare it with the Best of other Lines.

Study our New Catalog 51 or Pocket Manual No. 51 and then, if not a US user, place an order and be convinced.

UNITED STATES REGISTER COMPANY

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY

SOLD BY LEADING JOBBERS FROM COAST TO COAST

IRON FIREMAN GAS, OIL or COAL HEATING EQUIPMENT

the most complete line
for any size home, any type of heating

Now you can handle an outstanding and complete line—oil, gas or coal—all under one name plate. No matter whether your customers prefer oil, gas or coal; whether they like steam, hot water, or warm air heating; whether they want to install a new heating plant or modernize their present one, Iron Fireman oil burners, gas burners, or coal stokers will provide an abundance of carefree, dependable and economical warmth.

CHECK THESE IRON FIREMAN ADVANTAGES

1. Over a quarter-century of manufacturing and engineering experience in automatic heating.

2. A complete line—residential, commercial or industrial—for oil, gas and coal.

3. Year 'round hard hitting national advertising—continuous for 26 years.

4. Complete dealer merchandising plans.

5. Factory sales training and engineering assistance. Excellent territories still available in our expanding dealer organization. Write today for all facts or check Inquiry Card.

IRON FIREMAN MFG. CO.
3202 W. 106th St., Cleveland 11, Ohio

Please send me complete information on Iron Fireman warm air heating equipment, dealer franchise, and territories available.

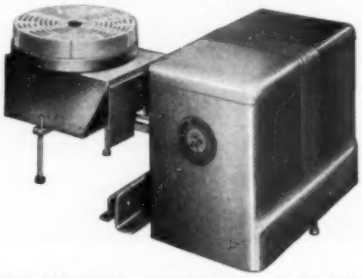
Name_____

Address_____

City_____ State_____

IRON FIREMAN VORTEX OIL BURNER

An outstanding development in oil burner engineering. Radiant heat from whirling, bowl-shaped flame, exclusive with Iron Fireman, starts at the grate line and blankets the hearth and combustion chamber walls. Saves up to 30 per cent over old style burners.



IRON FIREMAN RADIANT GAS BURNER

Features exclusive Iron Fireman radiant hearth and sealed hearth. Transforms non-radiant gas flame into rich, efficient heat. Engineered for furnaces and boilers originally designed for coal firing. Exclusive Iron Fireman Syncrostat day-night controls. Exceptional gas economy.

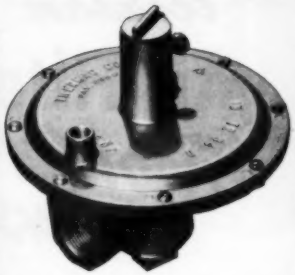
OIL, GAS OR COAL FIRED AUTOMATIC FURNACES

Complete oil, gas or coal heating units with built-in Iron Fireman Vortex oil burner, radiant gas burner, or Coal-Flow stoker. A wide range of sizes and models to meet every requirement.

IRON FIREMAN
MANUFACTURING COMPANY

CLEVELAND, OHIO • PORTLAND, ORE. • TORONTO, ONT.

GAS APPLIANCE REGULATORS
for years to come



OUTSTANDING PERFORMANCE
with Minimum Maintenance

The responsibility of an appliance manufacturer to produce a product with long trouble-free service has perhaps never been greater than it is today. As a builder of gas controls and of appliance regulators in particular, we share in this responsibility.

THERMAC Regulators are known for DEPENDABILITY. The simplicity of our design is assurance to THERMAC users of long uninterrupted gas appliance service. This means fewer service calls for the dealer and greater satisfaction for the customer.

Thousands of THERMAC Regulators have been in operation 15 years and more without repair. Insist on THERMAC for best in design, for accurate pressure and flame control, for high capacity and low maintenance cost.

Sizes ⅛" to 2½" IPS. Certified by AGA.

THERMAC

800 East 108th Street HM Los Angeles 2, Calif.

COMPANY

"20 years experience in building gas controls."

simple assembly . . . . low cost

PARKER-KALON *Jiffy* DAMPER REGULATOR

Developed to meet a demand for a low cost device for domestic air conditioning and furnace installations, the P-K* "JIFFY" Regulator incorporates such desirable features as: (1) Slip on attachment; (2) Wing-nut locking; (3) Rattle-proof fastening; (4) Lever, attached parallel to damper, instantly indicates position in duct; (5) Easy mounting on round or flat surfaces; (6) Formed of heavy gauge steel, cadmium plated to resist corrosion.

Also available from your P-K Distributor . . . the popular leakproof, rattle-proof "DIAL" Regulator, and for heavy duty, the "UNXLD" Quadrant. Remember . . . IF IT'S P-K . . . IT'S O.K.

PARKER-KALON*
DAMPER CONTROLS

Makers of the Original Self-tapping Screws

Write for free folder

Describes all types and sizes of P-K Damper Controls. Tells why leading contractors everywhere prefer them. Parker-Kalon Corporation, 200 Varick Street, New York 14, N. Y.

*TRADE MARKS REG. U.S. PAT. OFF.

VARIOUS MODELS
.5 to 15 gph

HomEase is the Burner You Can Easily Sell!

IT HAS REAL EXCLUSIVES . . .

1. FLAME-IZER

The HomEase Flame Shape Control that insures a high CO_2 by fitting the flame to the individual firebox.

2. FIRE-STAT

The HomEase Control that meters an extra amount of air to the flame on cold starts to prevent sooting and smoking.

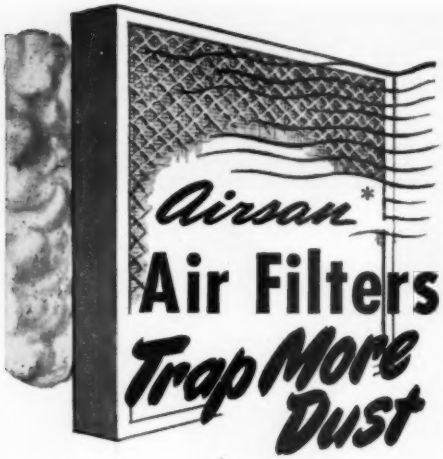
☆ HomEase Oil Burners let dealers *keep* their profits. Minimum of attention and less service calls make for satisfied customers. HomEase does have an important place in your line. Get the *facts* and you will see why so many HomEase Burners have required so few troublesome service calls. HomEase Products Company, Paterson 3, New Jersey.

LITERATURE & INDIVIDUALLY PRINTED SALES AND SELLING HELPS

Write Now for the Story!

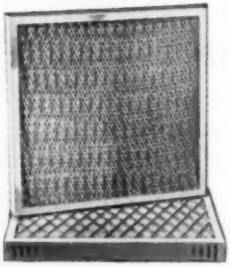
HOMEASE
THE KEY TO BETTER LIVING

THE OIL BURNER THAT'S BOUGHT FOR ITS TWO EXCLUSIVE VALUABLE FUEL AND MONEY-SAVINGS FEATURES



*Airsan** **Air Filters** *Trap More Dust*

For Air Conditioning, Heating and Ventilating



Greater efficiency — lower resistance is yours with an AIRSAN Air Filter.

A permanent, cleanable viscous type filter of all galvanized construction, having full bronze welded corners. Expanded metal face plate acts as lint arrestor to provide easier cleaning and servicing. Rated filtering efficiency 98.5%. In standard 1" and 2" thickness.

Also available for heavy duty service on industrial and special applications — in 2" to 4" thickness. Holding frames (for V-type or straight banks) are made for all type filters.

SEND FOR BULLETINS →

* FORMERLY AIRCOR

Air Filter Corporation

108F NO. WATER ST. • MILWAUKEE 2, WIS.

Canadian Representative: DOUGLAS ENGINEERING CO., Ltd. Montreal

A few Distributorships Available . . . write for Details.

Airsan

NEW LITERATURE

(*Use Coupon on Page* 115)

Gutter Guard 229

Folder describes and illustrates the Snap-On gutter guard which covers gutters completely and permanently and eliminates the need for cleaning. Made of heavily galvanized ¼ in. screen with aluminum binder. Guard is easy to install, snaps on gutter edge in convenient two foot sections.

Lockhart Mfg. Co., Detroit, Mich.

Furnace Pipe, Fittings & Accessories . . . 230

Catalog No. 404, Milcor Standardized Furnace Pipe, Gravity and Forced Air Fittings, Stove Pipe and Elbows, contains product specifications, applications, prices, shiping and packaging data on a number of product lines. Included are: galvanized wall stack and accessories; galvanized furnace pipe and accessories; registers, grilles, and regulators; stove pipe and accessories; revolving, spinner, and louver type ventilators; wood burning heaters and portable bake ovens. It is illustrated with photos and drawings, is completely indexed for ready reference.

Inland Steel Products Co., Milwaukee, Wis.

Humidifier Catalog 231

An 8 page catalog gives list prices of the manufacturer's products as well as sizes, dimensions, and capacities. Catalog has been separated into single sheet, two page consumer pieces, each describing a particular product application such as Form No. 701-A, Radiator Humidifiers, 701-B, Warm Air Humidifiers and Water Level Controls, 703, Auto-Vent Air Eliminators and Balancing Valve Adapter Unit, and 705, Steam Automatic Feeders and Low Water Cutoffs.

Form No. 702 is a 4 page piece combining 701-A and B for a complete humidifier piece, and Form No. 704 combines 703 and 705.

Maid-O'-Mist, Inc., Chicago, Ill.

Portable Oil Furnaces 232

A new 4 page folder describes a portable oil fired furnace that sprays heated air in all directions from its floor level outlet, heating areas up to 3,000 sq ft. Machine is particularly suited for heating work zones in large buildings where total heating is impractical. Warm air, sprayed out at ankle level, spreads and rises up around the bodies of workmen. Thus, even in cold weather, they can do precision work without gloves.

Other typical applications include heating barracks or other large open rooms, repair shops, garages, hangars, etc. Unit may also be used for drying plaster, fresh concrete, paint, etc. in buildings under construction.

Chimney Furnace Corp., Rockville, Md.

Alnor Velometer

gives instant, direct reading of Air Velocity . . . Anywhere!

Here is a precision-built, self-contained, portable instrument that gives instant, accurate reading of air velocities—anywhere. Measures speed of flow through ducts, grilles, motors, furnaces, etc., or in the open. Needs no calculations or reference charts. Anyone can use it and get accurate measurements. Available in a wide range of scales, and with a wide assortment of jets and fittings if needed. You'll want full details and prices, so write for Bulletin No. 2448-G. Illinois Testing Laboratories, Inc., Room 538, 420 N. La Salle Street, Chicago 10, Ill.

Alnor

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

I Found a Treasure – Buried in My Basement!

Like a lot of other heating contractors, I'd been worried about my profits. They were down because of the cut back in new house starts.

Then one day when I was in the basement of the shop—looking for I've forgotten what—I noticed the dusty old filing cabinet where I kept the records of jobs I'd done 15 or 20 years ago.

Looking at it, suddenly the thought came:

With the great advances in heating control equipment, every one of those jobs was now obsolete—and ripe for modernization!

Quickly I opened a drawer and grabbed a handful of folders. Here, I realized, was a ready-made prospect list for *modern* temperature controls.

I'd found a treasure—buried in my basement!

It didn't take me long to blow off the dust, get the cabinet upstairs and go to work on the list. First with direct mail pieces I got from Honeywell, then follow-ups by telephone and in person.

And, brother, it's really paying off!

Partly, I guess, because I use the same sales strategy I always use on new jobs . . . *I sell the Honeywell name.* People know it! People trust it! And people want the best . . . nowadays more than ever!

Thanks to that file in my basement—and thanks to Honeywell—my modernization business has more than filled the gap left by the cut in new construction.

MINNEAPOLIS **Honeywell**

First in Controls

NEW LITERATURE

(*Use Coupon on Page* 115)

Inclined Draft Gauges 233

Of interest to heating, ventilating, and air conditioning men is bulletin 109 describing portable, stationary, and laboratory type inclined draft gauges and accessories. Instructions for securing readings in conjunction with the manufacturer's pilot tubes are given, as well as suggestions for use of the draft gauge in connection with domestic heating plants. Tables and useful data gathered over the years are likwise presented.

Ellison Draft Gage Co., Inc., Chicago, Ill.

Registers & Grilles 234

Two new circulars describe registers and grilles for walls and baseboards. Made of 21 gauge mild treated steel, units are rust protected and bonderized. Baseboard registers are of the depth type with flanges to eliminate trim being carried around or flush type with a tight seal gasketing to be mounted on a trimmed opening. Patterns include fixed horizontal or vertical bar types. Horizontal type diffuses air 30 deg downward. Vertical type diffuses air 30 deg left or right as desired.

Louvra Corp., Union, N. J.

Ceiling Diffusers 235

A new brochure presents examples and ideas on ceiling architecture and shows how the four component parts controlling comfort — air diffusion, acoustics, lighting, and color — can be coordinated to produce ceilings which are functionally correct and architecturally pleasing.

Seventeen pages of illustrations show typical applications in offices, schools, theaters, churches, stores, etc. One page is devoted to drawings showing how to install the air diffusers in the various applications illustrated.

Anemostat Corp. of America, New York, N. Y.

Air Filter Cabinets 236

Literature describes an enclosure for commercial and industrial electric air filters which provides an attractive, compact housing for any size installation.

Enclosure is completely integrated, consisting of heavy sheet metal paneling throughout. Standard equipment includes pre-filter frames and built-in drain pans for collecting waste water during operation of the water wash cycle.

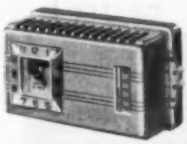
Unit can be quickly and efficiently installed because it is pre-assembled and matchmarked at the factory prior to shipment. Can be easily specified by engineers, architects, or contractors merely by stating the desired dimensions of the enclosure for the particular installation.

Trion, Inc., McKees Rocks, Pa.

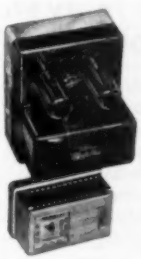
To help get your share of the modernization "treasure" be sure you know these

Facts it pays to know!

"Day-Nite" control and a positive shut-off device distinguish the Time-O-Stat from ordinary thermostats. The "Day-Nite" feature makes possible lowered night temperatures with *automatic* morning pick-up. Positive shut-off allows the home owner to turn off the heating plant—without making a trip to the basement. Can be used with almost all types of existing automatic heating systems.



The Honeywell Chronotherm is the most sensitive, most accurate bimetal thermostat ever built! It *automatically* lowers the temperature at night to save fuel; *automatically* raises it in the morning so your customers get up in a nice warm house. An ideal modernization item that can be used with almost all types of existing automatic heating systems. Available in standard or plug-in models.



Honeywell's Electronic Moduflow "package" was designed to give your customers the finest kind of comfort—even in the most changeable weather. The system compensates for temperature changes outdoors, load shifts indoors and structural heat loss. Electronic elements such as the relay amplifier and the electronic Chronotherm give precision control, are up to 100 times more effective than mechanical controls.

* * *

For illustrated literature explaining the above products in detail, write today to Minneapolis-Honeywell Regulator Co., Dept. AA-4-45, 2727 Fourth Ave. So., Minneapolis 8, Minn.

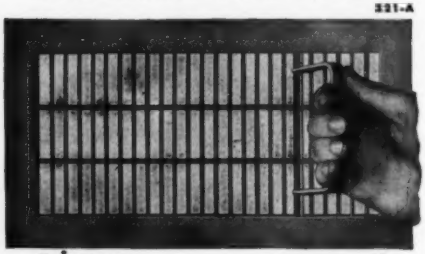
MINNEAPOLIS **Honeywell**

INDEPENDENT

"Fabrikated" WALL GRILLES for Commercial Installations

PROVIDE ADJUSTABLE DIRECTED AIR FLOW

321-A



UP OR DOWN

RIGHT OR LEFT

311-A

Made to fit openings in even inches from 8" x 4" to 60" x 40"

Independent Fabrikated* Adjustable Grilles (patented), rigidly constructed with stamped steel rims and steel bars, are made with either vertical or horizontal grille bars. Grille bars are *adjustable* before or after installation; available also with bars permanently set for straight flow.

Write for new Catalog No. 50—gives schedule of sizes, details and prices.

Always Leading — Always Progressing

*Reg. U. S. Pat. Off.

THE INDEPENDENT REGISTER CO.

3747 E. 93rd STREET • CLEVELAND, OHIO

NEW LITERATURE

(*Use Coupon Page* 115)

Stud Welding Equipment 237

Detailed specifications and performance characteristics of two Nelwelder power units specifically designed to improve and extend the advantages of stud welding are described in a new 4 page bulletin.

One is a small compact power unit which gives stud welding performance equivalent to two conventional 400 ampere generators in parallel. It can be used to weld studs up to and including $\frac{5}{8}$ in. diameter.

The other is a battery unit with a self-contained automatic charging device which is operated from any 110 v ac convenience outlet. Especially useful in construction work where power required for operation of motor driven welding generators is not available, this unit welds studs up to $\frac{1}{2}$ in. and can be easily transported in trailer units of various types.

Nelson Stud Welding Div., Morton Gregory Corp., Lorain, Ohio.

1951 ASHVE Guide 238

The 1951 edition of the ASHVE *Guide* has been completely revised and is the largest ever issued. It contains 1048 pages of technical text grouped in 50 chapters under the following major headings: fundamentals, human reaction, heating and cooling loads, combustion and consumption of fuels, systems and equipment, special systems, instrument, and code.

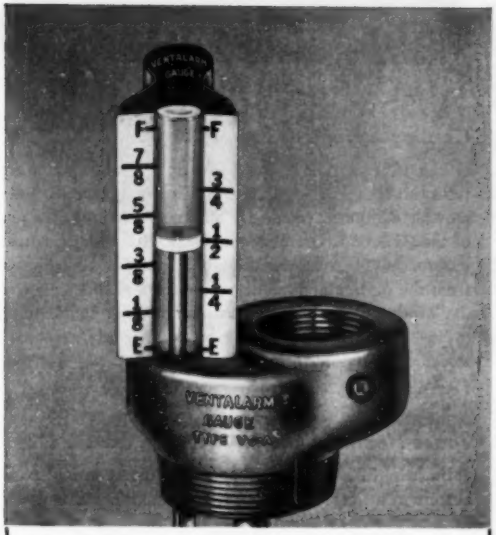
Symbols for use on drawing of heating, cooling, and air conditions system plans have been brought into conformity with the symbols recently adopted by the American Standards Association. The reference list of codes and standards has been enlarged to include 133 codes and standards of interest to the heating, ventilating, and air conditioning engineer. The latest editions of the codes are indicated and the names and addresses of organizations which can supply the various standards are given.

An elaborate cross index makes it easy to find information in the technical data section. Products of manufacturers who serve the industry are also indexed.

Significant features of the new edition are a 24 by 32 in. psychrometric chart, new tables for calculating cooling loads, simplification of the chapter on thermodynamics, enlargement of the chapter on heat transfer, and revision of the presentation on duct design. Descriptions and suggestions for the design of perimeter warm air heating systems have been added to the chapter on forced air heating systems.

The *Guide* is priced at $7.50 and is shipped postpaid direct from the society at 51 Madison Ave., New York 10, N. Y.

American Society of Heating and Ventilating Engineers, New York 10, N. Y.



SINGLE UNIT provides

Automatic Fuel Oil Delivery

Easy Check on Tank Contents

Scully VENTALARM® GAUGE

Combines Whistling Tank Fill Signal with super-visible tank gauge in one labor-saving unit.

AUDIBLE WHISTLE SIGNAL makes fuel delivery automatic for the customer. Oil Man simply goes direct to fill pipe and just fills 'til the whistle stops. Allows day or night delivery without entering the home.

SUPER-VISIBLE TANK GAUGE includes white button indicator inside leak-proof plastic tubing. Easily read by the whole family, even 10 feet away. Flexible float arm. Oil resistant cork float.

Installed directly on the fuel oil tank as an integral part of the vent pipe. No reducing bushing needed, so you install one item instead of three. Can be installed in partly filled tank.

Available for 275 gal. cellar tanks with depths of 24", 26", 27", 42", 44" and 47". Specify tank depth and tank opening when ordering from your regular Supply House.

Sizes: VG-A, 2" x 1¼"
VG-B, 1½" x 1¼"

TRADE PRICE
$2.95
Complete
(Subject to change without notice)

Approved by Underwriters' Laboratories, Inc.

SCULLY SIGNAL COMPANY
72 First Street, Cambridge 41, Mass.

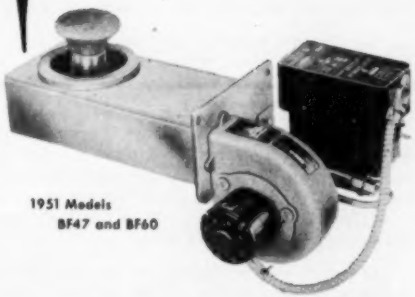
Canadian Licensee: EMPIRE BRASS MFG. CO., LTD.
London, Ontario

MORE FURNACE MANUFACTURERS THAN EVER BEFORE WILL CHOOSE

The New 1951 *Ball Flame* OIL BURNER

KRESNO-STAMM
Since 1927

Reg. U. S. Patent Office



1951 Models
BF47 and BF60

In 1951 manufacturers will again show their overwhelming confidence in the quality and performance of "Ball Flame" Burners by making them a vital part of the furnaces they will ship to small homes projects and to builders of hundreds of individual homes.

This *completely automatic, pressurized air, gravity type oil burner* is now standard for leading makes of small furnaces, installed in many flourishing home developments.

Builders and heating contractors in large numbers are writing the "Ball Flame" into their furnace specifications.

Here's Why

- ✓ **It's absolutely quiet—no motor hum, no flame roar.**
- ✓ **It burns less than 0.75 gallon per hour *without clogging*, flame deflection and burning out of fire boxes, as with small capacity pressure burners.**
- ✓ **It vaporizes and burns the oil perfectly — no starving the center of burner flame and poor combustion.**
- ✓ **An automatic levelling device is built into each burner.**

KRESNO-STAMM MFG. CO. (America) Inc.
PALISADES PARK, N. J.
Canadian Affiliate: Kresno-Stamm Mfg. Co. (Canada) Ltd.
7452 Drummond Street • Montreal, P. Q.

Dealers!

cash in now by selling

STEWART Safety Sealed WARNER
DOMESTIC HEATING

in this profitable Wisconsin area

RESORTS . . . CABINS . . . TOURIST COURTS . . . HOMES . . . IN MANY SMALL COMMUNITIES NOW AFFORD BIG SALES OPPORTUNITIES FOR THIS NEW, LOW-COST, EASIER-TO-INSTALL GAS HEATING.

Rich in prospects! This large Wisconsin area is "wide open" for the many exclusive sales advantages of Stewart-Warner's "Safety-Sealed" Gas Heating Units. Here you'll find customers for whom equipment like this serves best, suits best. Customers you can sell easier, faster, every time.

Compact, fully automatic, readily adaptable to dozens of heating needs..."Safety-Sealed" Units give your heating line wider appeal to a wider market. Easily, quickly installed in any exterior wall, they eliminate all need for chimneys, ducts, electricity! Save materials, installation cost. Provide individual heating requirements with either manual or thermostatic controls. Operate silently, dependably... with either natural, manufactured or LP gas.

Powerful, concentrated dealer support—by the Metal Service Company of Green Bay, Wisconsin—makes your selling job easier. Well known throughout the area, Metal Service provides the rapid, efficient delivery and handling of equipment that makes dealerships profitable. Why wait longer?

GET THE FACTS FIRST HAND from a trained heating representative. Wire, write or phone...

Metal Service Company

WHOLESALE ONLY
100 Stuart Street, Green Bay, Wisconsin

NEW LITERATURE

(*Use Coupon on Page* 115)

Cooling & Heating Equipment 239

The 1951 edition of the book How to Have Comfort from Moving Air describes 23 different types of air moving equipment made by 113 manufacturers. Each of the 23 broad classifications opens with a short article explaining the use, installation, and results to be achieved from the particular type of equipment and then catalogs the products of the manufacturers making that equipment. Thus the book serves as buying guide, reference work, and sales training manual.

Torrington Mfg. Co., Torrington, Conn.

Space Heating Bulletin 240

Bulletin 526 describes Counterflo direct fired space heaters in a range of gas or oil fired models with outputs from 400,000 to 2,000,000 Btuh. Highlighted in the bulletin is a comparison chart showing that steel requirements for the installation of these heaters is substantially less than that of other commonly used systems. In most cases, the bulletin points out, steel needs for heating systems can be reduced 50 to 70 per cent through the use of direct fired warm air heaters.

Dravo Corp., Pittsburgh, Pa.

Oil Burner Catalog 241

A new condensed 16 page catalog in color gives a complete listing, with illustrations, of the company's oil burner products including: fully automatic horizontal rotary type, steam turbine driven type, combination gas-oil type, semi-automatic type, and pressure atomizing type. Booklet also features a unique selector chart, plus listing of specifications and capacities, and will prove particularly helpful where additional installation knowledge is required before ordering oil burner equipment. Operation and control of each unit is described in detail.

Ray Oil Burner Co., San Francisco, Calif.

Wood Burning Furnace 242

A gravity warm air furnace designed especially to burn wood is equipped with thermostatic damper controls for correct combustion. Magazine feed provides sufficient space for fuel to burn at full capacity for 12 hours without refueling more than twice a day when seasoned wood is used. Operates up to 24 hours in mild weather without any attention.

Burns all kinds of wood, all sizes up to 8 in. logs 2 ft long. Construction eliminates fuel waste by burning all combustible gases formed during the distillation process.

A 4 page folder includes a cutaway illustration of the Woodomat construction and complete specifications.

Pantex Mfg. Corp., Pawtucket, R. I.

Proof!

THAT STEWART-WARNER *"Safety-Sealed"* GAS HEATING UNITS ARE...

the MOST PROFITABLE Heating Equipment you can sell!

They're all here... the cold hard facts on today's hottest home heating equipment. Go over them now... check them point for point. See why *all things considered*—flexibility and speed of installation, operating efficiency, safety, economy, unlimited market appeal—you can't recommend another heating system that assures *more* customer satisfaction or *more* profit to yourself!

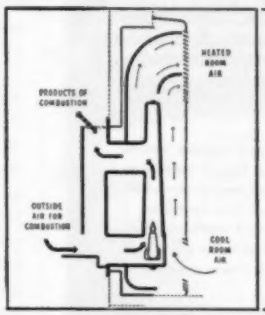
No Chimneys, No Ducts, No Electricity Required! Only one utility connection needed—the gas line. Room-size, in-the-wall "Safety-Sealed" units bring you greater flexibility... free you from complicated chimney installations... give you a dependable source of equipment in the face of the growing difficulty of procuring steel for sheet metal ducting.

Quick, Easy Installation! "Safety-Sealed" units fit in between the studs of any exterior wall—wood, brick, cement-block or stucco. Reduce "job-time" to a minimum. Enable you to install a greater number of units with less time, with less work, at less cost!

No Moving Parts to Maintain or Replace! "Safety-Sealed" units operate dependably on manufactured, natural or LP gas. Give years of "trouble-free" service. Relieve you of the customary "headaches" and complaints that often follow other heating installations.

New, Greater Versatility! For new home building, remodeling, apartment conversion... compact "Safety-Sealed" units bring clean, safe automatic gas heat to one room, a suite or an entire building—*all irrespective of the present heating system used.* Give you wider sales appeal to a wider market.

Model 991-14 14,000 BTU/HR 18" x 24" x 4"
Model 992-20 20,000 BTU/HR 18" x 38½" x 4"



Exclusive "Safety-Sealed" Design

Positively seals all products of combustion from contact with heated room air. The "Safety-Sealed" exterior vent draws all combustion air from outdoors. Vents all combustion products outside.

WRITE NOW for complete, free information and specifications on the complete line of Stewart-Warner "Safety-Sealed" Gas Heating Systems. Select dealerships are available in some territories. Address inquiries to Dept. B-41, 1514 Drover Street, Indianapolis 7, Ind.

Approved by American Gas Association

STEWART Safety Sealed WARNER
DOMESTIC HEATING

RANDALL
PILLOW BLOCKS ASSURE
3-way safety

1 "Deep Well" reservoir holds 50% more oil assuring safe operation over longer period of time with less maintenance.

2 Lubricating graphite in grooved bearing rations oil for safe operation.

3 Heat increases flow of oil from reservoir giving added safety at elevated temperatures.

Only Randall "Deep Well" pillow blocks offer all these sensational 3 way safety features. Not only will they assure safer operating conditions for your equipment but they will also run quieter and give longer, trouble-free operation. Randalls are self-aligning and precision made to fit all standard shaft sizes from 1/2 to 3-15/16 inches.
All this plus their versatility to be mounted horizontally—vertically—or inverted, assures low cost and ease of installation.

THERE IS A RANDALL THAT'S RIGHT FOR EVERY JOB.

Write today for catalog No. 103 showing complete line of Randall pillow blocks for light, normal, or heavy duty, in either one piece steel or two piece cast iron housings.

*Ball assembly also available without housing—ideal for integral inclusion on original equipment applications—easily adapted for grease type lubrication. If you have an unusual application problem send it to Randall. Our engineering department will be happy to assist you.

BRONZE BAR STOCK
BRONZE BUSHINGS
PILLOW BLOCKS
SHEET LUBRICATOR
Randall
GRAPHITED BEARINGS
THRUST WASHERS
BABBITT METALS
SAFETY COLLARS

RANDALL GRAPHITE BEARINGS, INC.
1000 S. Greenlawn Avenue, Lima, Ohio

NEW LITERATURE

(*Use Coupon on Page* 115)

Comparative Heating Cost Chart 243

The comparative cost of automatically heating a building or a home with buckwheat or rice size anthracite, oil, and gas can be quickly and easily determined by a new pocket size chart entitled Comparative Yearly Costs of Heating a Building with Various Fuels. Chart has been prepared from data published by the University of Illinois Small Homes Council in Bulletin No. G3.5. This bulletin is based on years of experimental study of the actual quantities of various fuels burned in different equipment required to heat homes.

Anthracite Institute, Wilkes Barre, Pa.

Gas Conversion Burner 244

Folder describes Spreader Flame conversion gas burner. Flame is scientifically controlled to spread heat evenly over the walls of the furnace. Controls are fully automatic. When desired temperature is reached, gas automatically shuts off and when thermostat falls below desired setting burner starts automatically. If gas pilot should be shut off, the gas valve automatically closes, preventing the passage of gas and will not open again until pilot is relighted.

Folder is printed in two colors, is well illustrated with photographs and line drawings.

Eckhart Mfg. Co., Inc., Union, N. J.

Both Feet On The Ground 245

An encyclopedia of appliance and specialty retailing entitled *Both Feet on the Ground* was compiled from notes taken during actual interviews with successful appliance and specialty dealers.

Typical chapter headings are Where and Who Are Your Customers, Salesmanship-in-Print, Repair Service Builds Profits, Telephone Magic, Bookkeeping Isn't So Simple As It Sounds, and Getting Your Ideas Across. A chapter on advertising by mail covers such subjects as methods of assembling lists, advertising appropriations for direct mail, and profitable types of direct mail advertising. Another, entitled Local Dealer Associations, tells how a local association functions and discusses fair trade laws and trade practice codes. The chapter on bookkeeping explains the importance of keeping accurate records, tells how to figure depreciation and how to save on taxes.

Both Feet on the Ground covers all aspects of running an appliance business. Anyone who hopes to become a better retailer can find in it a number of profitable ideas he can apply to his own business.
Both Feet on the Ground, by George F. Taubeneck, 638 pages. Price, $5.95.

Conjure House, 450 *Fort St., Detroit* 26, *Mich.*

INDUSTRY ITEMS

MORE THAN 200 Victor furnace dealers from all points of the nation attended the Hall-Neal Furnace Co.'s 1951 Dealers' Sales Conference in Indianapolis February 21st and 22nd. The theme of this year's two-day conference was built around the outlook for furnace dealers this year. Numerous speakers in the warm air heating business and in the Hall-Neal company gave the dealers their ideas of what to expect.

Fred Gombert, sales manager, pointed out that although military requirements for critical metal sheets would be greater, the heating industry has a real selling job to do. "We attribute this to the fact that fewer furnaces will be needed for new homes this year as compared to 1950. Therefore, our selling job is in the replacement field."

John Payton, recently appointed assistant sales manager, introduced the new owner's instruction booklets which clearly point out to the customer the service required on automatic heating equipment, both that which can be done by the homeowner and that which should be left to a qualified service man.

Robert Schmeider, sales manager of the Inland Steel Products Co., talked about the Outlook for Sheets, Pipes, and Fittings. Alex Carroll, sales manager of the Holcomb & Hoke Mfg. Co., pointed out to dealers that stoker

Hall-Neal meeting

sales are on the upswing in both the residential and industrial markets. James A. Worsham, nationally known sales consultant, writer, and lecturer, addressed the group on Low Pressure Selling.

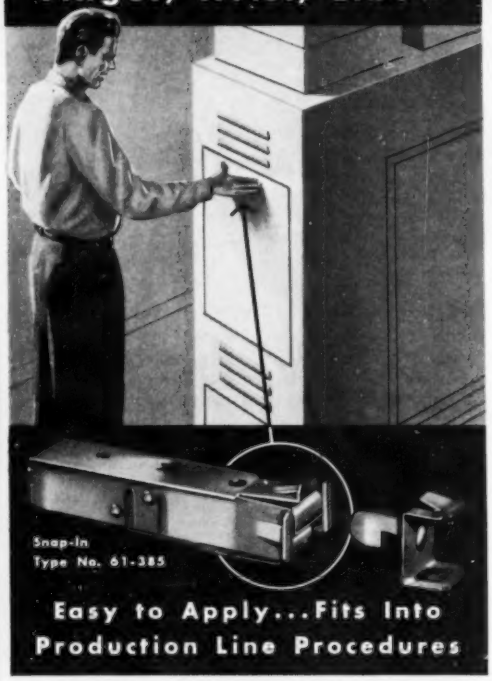
Another highlight of the session was the "Question Box" period. During this time, dealers got factory answers to questions concerning engineering, service, merchandising, installation, and other items of interest.

Other well-known men in the heating field gave Victor dealers their viewpoint on what to expect in '51. Ed Carter, publisher of *Snips*, reviewed substitutes used in furnace installations during the last period of critical shortages. With illustrations, he showed how well-engineered, satisfactory systems can be installed by using substitute materials. Dr. Harry Friedberg, chief engineer Adams Mfg. Co., discussed with Victor dealers the Fundamentals of Burning Gas.

Thor
DRILLS
40 PORTABLE ELECTRIC MODELS
Belt Sanders
Bench Grinders
Drills
Drill Stands
Fender Hammers
Grinders
Electric Hammers
Impact Wrenches
Nibbler
Nut Setters
Polishers
Sanders
Saws
Screw Drivers
Tappers
Valve Refacers
Valve Reseaters
Air Tool Kits
From midget type ¼" models to heavy production 1¼" machines, there's always the one best drill for the job—a THOR . . . all handle styles, all popular speeds—every tool packing Thor's extra power . . . featuring the light weight and handling ease of Thor's modern design . . . available with stands and accessories. Call your Thor distributor for a free demonstration — or write for Catalog E-2. Independent Pneumatic Tool Co., Aurora, Ill.
Write for free Electric Tool Catalog E-2
Thor PORTABLE POWER TOOLS
ASK FOR THE Silver Line
BUY IT from your DISTRIBUTOR

NATIONAL TUTCH LATCH®

Opens Cabinet Doors Automatically with the Gentle Touch of Finger, Wrist, Elbow



Easy to Apply...Fits Into Production Line Procedures

More beauty for your metal products . . . more convenience for the ultimate user . . . easy operation . . . sure, positive latching action . . . all at small cost. Tutch Latch eliminates the need of exterior handles or knobs. It can be "snapped in" or spot welded . . . inside, out of sight. It's a natural for your use.

Many Logical Product Applications

Tutch Latch is perfect for kitchen cabinets, utility cabinets, space heaters, medicine chests, in fact most any product with swing door. Specify whether metal or wood application.

Write Us For Complete Information

Distinctive Hardware... All From 1 Source

NATIONAL LOCK COMPANY
Rockford • Illinois

Van Dorn POWER means faster assembly!

DRILLING LEAD HOLES, **bolt holes and holes to be tapped goes faster with a Van Dorn HOLGUN! Drives twist drills up to ¼" diam. in steel, wood augers up to ½" diam. in hardwood, Hole Saws, small wire brushes for cleaning and burnishing.**

DRIVING SCREWS **and running nuts is faster, more accurate with a Van Dorn SCRUGUN! Drives machine screws to ¼", self-tapping screws to #12, wood screws to #10 x 2". Positive and adjustable clutch models.**

● What a team Van Dorn HOLGUNS* and SCRUGUNS* make for speeding up your fabricating and assembly work! Their compact, balanced design makes them easier to handle, less tiring to use, gets them into hard-to-reach spots. Their powerful Van Dorn-built motors give you uninterrupted, trouble-free performance. Their extra-tough gears, shaft and chuck spindles and husky housings give you extra years of service. Call your nearby Van Dorn Distributor for a demonstration of these cost-cutting tools. Write for free catalog to: THE VAN DORN ELECTRIC TOOL CO., 782 Joppa Road, Towson 4, Maryland.

*Trade Mark Reg. U. S. Pat. Off.

For Power Specify

(Div. of Black & Decker Mfg. Co.)

"Van Dorn"

Portable Electric TOOLS

DRILLS • PORTO-SHEARS • SANDERS • BENCH GRINDERS

RECRUIT MARK AUER, vice president of A & A Register Co., Cleveland, Ohio was presented with a certificate showing he is an outstanding trainee-member of the 101st Air Borne Division at Camp Breckenridge, Ky. Shown presenting the certificate (right) is Brigadier Gen. C. E. Ryan, commanding general of the division.

THE LOCKFORMER CO., Chicago, Ill. recently held a gala open house to allow the families of its employees to see the plant and its facilities. A booklet was published giving a brief history of the company and its growth.

The first Lockformer was made and patented in 1935 by Harold G. Flagler. In the brief time since the first machine was made, over 20,000 Lockformers have been sold. Mr. Flager was forced to retire from active management of the business in 1946. He continues to act as design adviser on all engineering developments.

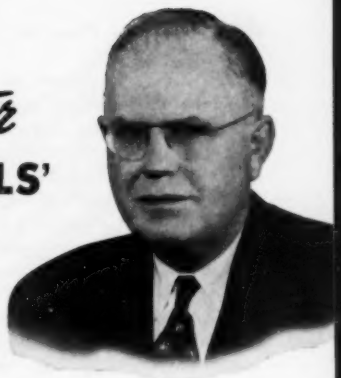
THE METROPAC SALES DIVISION of the Metromatic Manufacturing Co., Everett, Mass., announces the appointment of the Febmar Co., 200 W. 16th St., New York, N. Y. as exclusive distributor covering the entire Metropolitan New York area for Metropac heating equipment. The Metropac warm air heating unit incorporates a domestic water heater.

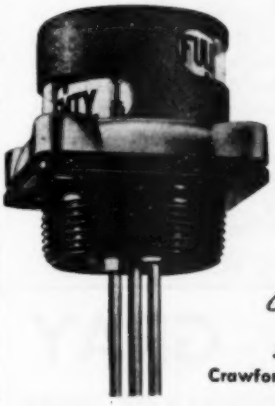
J. B. Forbes, president of Febmar Co., is now setting up dealerships in the area.

THE BOARD OF DIRECTORS of the J. V. Patten Co. announces the election of Don C. Patten as the new president of the corporation. Other officers elected were John H. Patten, vice president, and John V. Patten, permanent chairman of the board of directors and secretary & treasurer. C. A. Pearce was re-appointed general manager and director of the sign division and A. B. Garman was reappointed personnel director and director of the specialties division.

A NEW SERIES of educational shows designed as a service to heating and refrigeration engineers and servicemen began in Memphis on April 9 and will travel throughout the southern and southeastern states, according to an announcement by R. H. Luscombe, general

"Rochester 'DUAL-DIALS' mean EXTRA PROFIT!"





"We've stocked and sold Rochester 'Dual-Dial' Gauges for many years . . . because we know that the majority of our dealers prefer them. 'Dual-Dials' eliminate service calls caused by faulty gauges —this means extra profits— records prove it. They assure the kind of customer satisfaction that helps build our business, too."

Jerry Crawford

JERRY Y. CRAWFORD, Owner
Crawford Plumbing & Heating Supply, Chicago, Illinois

ROCHESTER "DUAL-DIAL" OIL TANK GAUGES are preferred by dealers and wholesalers the country over because of their positive leak-proof feature and long-term dependability. These men have found through experience that the Rochester "Dual-Dial" is the *one gauge* they can install with complete confidence. They know it will not cause trouble through faulty operation or fume leakage, even under pressure.

Rochester "Dual-Dial" Gauges are ruggedly built with permanent magnetic indication. They have been Underwriters' listed for more than 25 years. Stocked by leading wholesalers for basement oil burner storage tanks in the following depths—22", 24", 26", 27", 42", 44", and 47"; 1½" and 2" pipe thread connections. Special lengths to order . . . STOCK UP NOW. Rochester Manufacturing Co., Inc., 66 Rockwood St., Rochester 10, N. Y.

ROCHESTER
MANUFACTURING COMPANY, INC.
DIAL THERMOMETERS GAUGES AMMETERS

ROCHESTER DEPENDABLE ACCURACY GAUGES

sales manager of Penn Electric Switch Co., Goshen, Indiana.

This show was created to give a dramatic visual demonstration in the use, construction, installation and servicing of automatic controls. Included in the elaborate equipment are giant controls which actually operate, colored slides, and charts.

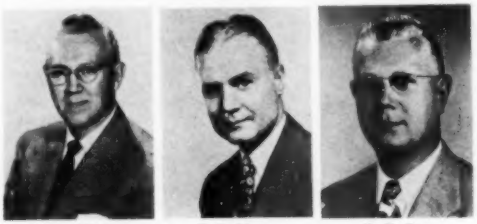
Penn has had considerable experience in creating and staging educational meetings of this nature. Some 15 years ago, the company pioneered demonstration shows with the objective of improving service to the consumer by giving instructional aid to the servicemen.

Although the current show is patterned after previous ones to some extent, it includes the latest current information and service helps, and is expected to be even more beneficial to the trade.

Meetings are being arranged and sponsored in each city by local jobbers of Penn controls.

CHARLES J. CAMMOCK, JR. assumed duties the first of the year as district manager of the northern Ohio area for the Roof Ventilator Division of The Swartwout Co. The announcement was made by E. H. Bellard, sales manager. Mr. Cammock is in charge of sales and service, operating from the main office at the Swartwout plant, 18511 Euclid Ave., Cleveland. He has for several years assisted Swartwout representatives from coast to coast in sales promotion and service. He had a previous background of ventilating engineering.

DIRECTORS OF Iron Fireman Mfg. Co. recently elected William J. O'Neil chairman of the board and chief executive officer of the company, it was announced by Frank S. Hecox for the board of directors. Mr. O'Neil has managed the company's Chicago operations for the past 15 years and is a leading figure in the heating industry.



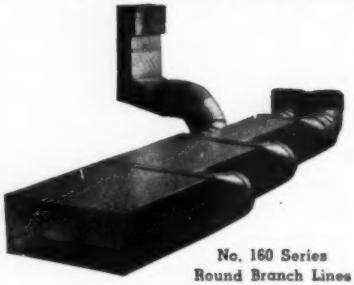
Wm. O'Neil F. S. Hecox C. T. Burg

Other Iron Fireman executives were also named to high posts within the organization. Frank S. Hecox will continue as vice president and treasurer. The following men will assume new additional positions: C. T. Burg, Cleveland, vice president in charge of sales; E. C. Webb, Cleveland, vice president in charge of research and development engineering; Lewis J. Cox, Portland, vice president in charge of public and employee relations; Jack L. Jennings, Portland, vice president in charge of operations and C. W. Snider, Portland, continuing as secretary and controller.

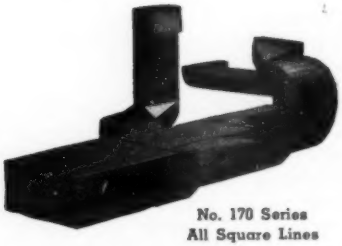
THE APPOINTMENT OF G. H. Piering as sales representative for the north Texas territory has been an-

GRAY *"Snap-Rite"*

FURNACE PIPE AND FITTINGS
AIR CONDITIONING PIPE AND FITTINGS



No. 160 Series
Round Branch Lines



No. 170 Series
All Square Lines

A complete line of Gravity and Forced Air Pipe and Fittings with our positive "SNAP-RITE" Lock for quick assembly and erection. Wall Stack and Fittings in 3¼" standard depths. Truck Pipe and Fittings in 8" standard depths.

Write for Catalog

GRAY METAL PRODUCTS, INC.

30 Carlton Street Rochester 7, New York

JOHN ZINK
Central GAS HEATERS

MODEL AF-110

Here is truly a universal, efficient, simple, and compact CENTRAL HEATING UNIT. Fully automatic, it is a complete packaged unit ready for installation. The two heaters shown are almost identical in operation and design of the heat exchanger. The two different types of casings are furnished to meet requirements for a particular application.

MODEL HB-110

Heaters may be installed in the basement, attic, service closet, or utility room of a home. The AF-110 may be installed even under the house if certain provisions are made for the draft diverter. For industrial applications, it may be installed on a shelf or balcony; as a suspended heater and as a duct heater.

Each John Zink Central Gas Heater is equipped with an automatic safety shut-off that is really automatic.

The John Zink Central Gas Heater is designed as a winter air conditioner with a summer switch to provide air circulation during warm weather.

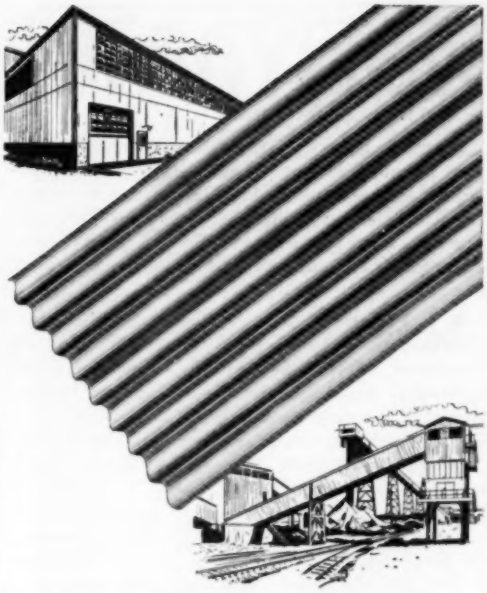
Write for Literature

JOHN ZINK COMPANY

4401 South Peoria

TULSA, OKLAHOMA

New York — Salt Lake City — Houston — Los Angeles



FAST Construction
LESS Maintenance
when you build with ALUMINUM

All the facts you need to design and erect buildings using Alcoa Industrial Building Sheet have been assembled in this new book. Loading tables, application details and accessory lists, show you how you can save erection time and maintenance costs.

Write for FREE BOOK

BECAUSE REARMAMENT NEEDS COME FIRST, the supply of Alcoa Industrial Building Sheet is limited, but Alcoa is not limiting its assistance to designers and erectors. For special information and a copy of booklet AD-247, call your local Alcoa Sales Office, or write ALUMINUM COMPANY OF AMERICA, 807D Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA

ALCOA
INDUSTRIAL
BUILDING SHEET

nounced by Research Products Corp., Madison, Wis., manufacturers of air filters.

Mr. Piering has been connected with the home office of the firm in Madison. His home address in Texas will be 3840 Wentwood Drive, Dallas.

FRANK H. SNYDER, 87 died March 7 in his home at 1153 Lincoln Way East, Massillon, Ohio, after a year's illness. He was president of the Hess-Snyder Co., furnace manufacturers, and a director of the Ohio Merchants Trust Co., a vice-president of the Brown Lumber Co. and the organizer and president of the Ideal Co. department store.

W. E. FALBERG, manager of stainless steel sales at the Chicago plant of Joseph T. Ryerson & Son, Inc., steel distributors, will speak before the Evansville Sheet Metal Contractors Association, Evansville, Ind., on Tuesday April 24. His subject will be, Fabrication and Application of Straight Chromium Stainless Steels.

From 1945 to 1948 Mr. Falberg was in charge of sales of stainless steel at the Cleveland plant of the Ryerson company, and for the past three years has been engaged in a similar capacity at Chicago. His firm pioneered in the distribution of stainless steel from stock, beginning in 1925 when the production of stainless steel was in its infancy. Today the Ryerson company is said to be the country's largest distributor of stainless, supplying both commercial and aircraft quality in a full range of types, shapes and sizes.

The importance of stainless steel to our nation's growing defense program makes Mr. Falberg's talk particularly timely and of great interest to fabricators who may be switching from their normal production to defense work.

OFFICERS OF the Norman Products Co., Columbus, Ohio, have announced the appointment of David A. Ruen of Detroit and William R. Sundermeyer of New Rochelle, New York, as regional sales managers.

David Ruen

W. R. Sundermeyer

Mr. Ruen, a graduate of the University of Detroit with an LLB degree was a manufacturer of gas water heaters in Detroit prior to becoming associated with Norman distributors in the state of Michigan. As regional manager, his territory consists of Michigan, Minnesota, Illinois, Iowa, Nebraska, North Dakota, and South Dakota.

Mr. Sundermeyer will cover Maine, Vermont, New Hampshire, Connecticut, Rhode Island, Massachusetts,

MORRISON Carry-All Model B-910

WHICH MORRISON Carry-All serves YOUR heating and plumbing business BETTER?

THE two models of the MORRISON Carry-All, the world's first mass-precision-produced, all-purpose, all-steel husky service body, differ *only in size.* Both are designed for ready adaptation to your job . . . whatever your special requirements, the Carry-All . . . with its greater mounting space, its lower mounting height, its weatherproof compartments . . . can be easily and simply equipped with Carry-All optional installations—pipe racks, pipe vises, overhead ladder racks, material trays, canvas top or sliding metal roof, support jacks, etc.

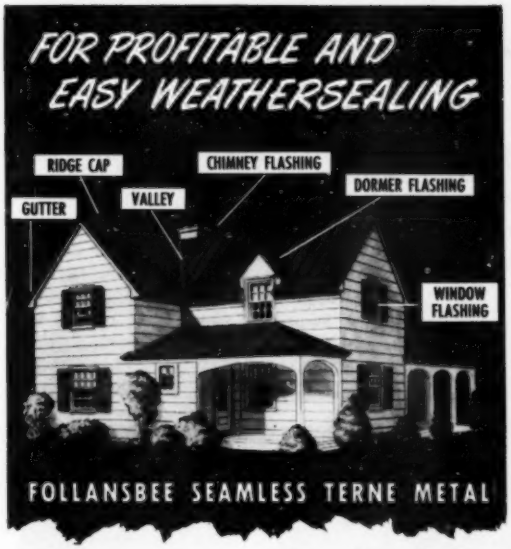
MORRISON Carry-All Model B-750

Carry-All Body Division

MORRISON STEEL PRODUCTS, INC.

525 AMHERST ST. BUFFALO 7, N. Y.

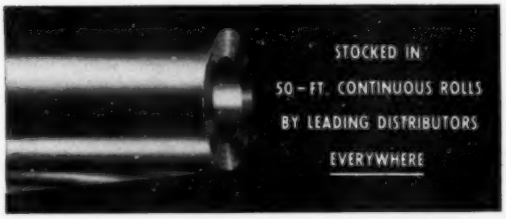
Write for your free guide to the selection of Carry-All bodies and accessories.



Every house needs weathersealing and every flashing, coping, conductor in modern housing is another opportunity for you to make a nice profit by installing Follansbee Seamless Terne Metal.

Don't overlook these profitable weathersealing jobs on new construction and on repair contracts. Time-proved Follansbee Terne Metal is easy to handle and apply—its well-known durability assures customer acceptance.

Industrial and commercial buildings need weathersealing, too. When you make your regular check-up on roof maintenance contracts be sure to show samples of Follansbee Terne Metal to architects and engineers. Tell them about the trouble-free Follansbee Terne Roofs in service fifty years or more. That's the direct route to profitable weathersealing and roofing contracts.



Drop us a note and we'll tell you who handles Follansbee Terne Metal in your territory.

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 30, PA.

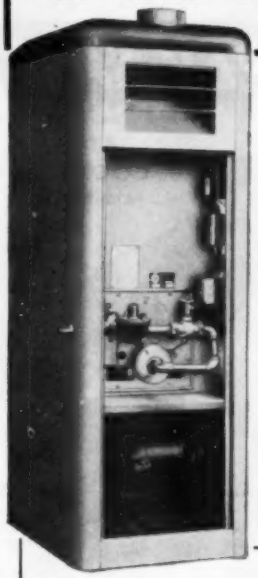
COLD ROLLED STRIP · SEAMLESS TERNE ROLL ROOFING POLISHED BLUE SHEETS

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, St. Louis, Kansas City, Nashville, Houston, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Plants*—Follansbee, W. Va.

FOLLANSBEE METAL WAREHOUSES

Pittsburgh, Pa. · Rochester, N.Y. · Fairfield, Conn.

HI-BOY or LOW



handles any forced air problem

SECURITY SGF

The remarkable new

SECURITY

MODEL SFA FURNACE

Security leads the trend to compact efficiency with the new SFA Series. Adaptable to every domestic winter air conditioner situation. Versatile enough for conventional, basementless or utility room installations. Completely engineered for effortless, automatic heating. Yes, sir . . . the SFA brings greater economy and longer life to home heating!

Only Two Connections Necessary

Completely assembled at factory. Hook up just one gas and one power line! Filter racks optional at bottom, right or left. Each control can be removed without disturbing other wiring. You'll be amazed at its versatility. Available for all gases. Write or wire now for complete information, prices.

SECURITY MFG. CO.

1630 Oakland St., Kansas City 3, Mo.

Also manufacture the famous Security Heavy Duty Water Heater and full Line of Gravity, All Purpose, and In A Wall Furnaces and Conversion Burners.

The heavy duty tool with built-in blower.....

RCS SUPER SAW

AIR COOLED
PATS. PEND.

...an all-purpose roughing-in saw that saves more time than any other tool in your kit!
...fits any heavy-duty ¼" drill—10 different blades saw ANY material—no starting hole needed.
...built to stand up under constant, every day Contractor or industrial use!

Cutting opening in oak flooring in less than 3 minutes—no starting hole needed!

● **NO STARTING HOLE NEEDED**...Simply place guide next to material and "rock" tool into an upright position.

● **CUTS RIGHT THRU IMBEDDED NAILS** . . . wood, plaster, iron pipe, sheet metal, "Transite" and most other materials—even in cramped quarters.

● **FITS ANY HEAVY DUTY ¼" or ⅜" DRILL** . . . as easy as changing bits! Overall length only 10¾"; weight only 3 lbs. 6 ozs.

● **ANTI-FRICTION REPLACEABLE BEARINGS—BUILT-IN BLOWER** . . . Blower keeps tool comfortably cool even under continuous use—blows dust and chips away from cutting line. All friction surfaces are of "Oilite", phosphor bronze or high speed ball bearings. All wearing parts are replaceable.

Super Saws and Blades are listed on Federal Supply Schedules, Class 40 Material.

SEND THE COUPON TODAY for Complete Information and Prices

R.C.S. TOOL SALES CORPORATION
JOLIET, ILLINOIS, U.S.A.

Gentlemen:
Please send us Bulletin A-4 and name of the nearest Super Saw distributor.

Name_____

Address_____

City_____ Zone____ State_____

New York, New Jersey, Pennsylvania, Delaware, Maryland and Virginia. He has been prominent in the New York area as sales executive. He sold for Paco Products, Inc., of New York City, a Norman distributor, before coming to Norman Products Co.

THE SWARTWOUT CO., manufacturer of power plant and industrial ventilating equipment, announces the establishment of a new company-operated sales office at 836 Michigan Theatre Building in Detroit.

Director of power plant equipment sales for the new office, which will service southeastern Michigan, is Kenneth P. Hengesbach, former power plant equipment sales engineer for the Swartwout Philadelphia office. Mr. Hengesbach, a graduate of the University of Detroit, was previously with the Molded Specialties Co., Inc., and the Independent Pneumatic Tool Co., both in Cleveland.

K. P. Hengesbach

Ralph Blanchard

RALPH W. BLANCHARD has announced his retirement as president of the Hart & Cooley Mfg. Co. of Holland, Mich., after completing 37 years of active service with the company. Mr. Blanchard continues as a director of the company and has been elected Honorary Chairman of the Board. William H. Hart, Jr. succeeds him as president.

Mr. Blanchard began his career with Hart & Cooley as a representative in southern Illinois in 1914 and was manager of the Chicago office for 26 years. In 1923 he was elected secretary of the company and in 1926 was elected president, serving in this capacity until his retirement.

During his tenure with Hart & Cooley, Mr. Blanchard traveled extensively and became acquainted with as many people in the heating business as anyone in the industry.

His service to the heating industry included 16 years as a director of the National Warm Air Heating and Air Conditioning Association, and 13 years as president of the National Warm Air Register Manufacturers Institute. He was also chairman of the code committee for the industry and represented the industry as chairman of various committees during World Wars I and II.

Mr. Blanchard has joined Mrs. Blanchard at this winter home at 1209 N.E. 96th St., Miami, Fla., and they plan to make this their permanent residence.

LAWRENCE KNAPP, sales manager, Accessories Division of Wm. Steinen Mfg. Co., Newark, N. J. announces the appointment of five new field representatives as follows:

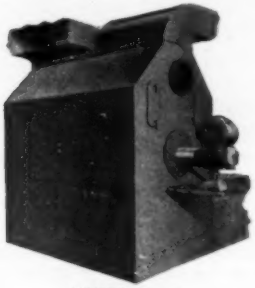
John T. Lordan of Newton, Mass. to cover Maine, New Hampshire, Vermont, Massachusetts, and Rhode Island.

NATIONAL CHAMPION

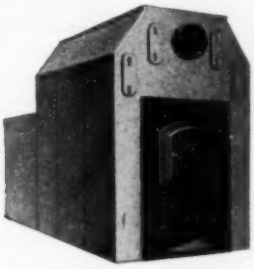
OIL, GAS AND STOKER FIRED HEAVY DUTY STEEL HEATERS

AVAILABLE WITH OR WITHOUT INDUCED DRAFT BLOWERS

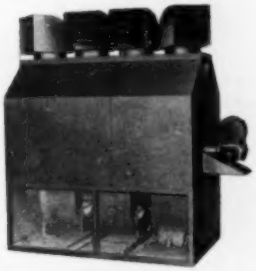
WRITE US FOR LITERATURE DESCRIBING COMPLETE LINE



MODEL D
200,000 TO 1,500,000 BTU



900 SERIES
400,000 TO 2,000,000 BTU



MODEL H
500,000 TO 1,500,000 BTU

CORRECT HEATING FOR

AUDITORIUMS	CHURCHES
DRIERS	FACTORIES
GARAGES	HANGARS
OFFICES	SCHOOLS
THEATERS	WAREHOUSES

NATIONAL HEATER COMPANY

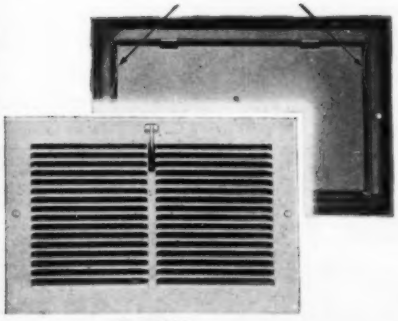
2180 CLEORA AVE. ST. PAUL 4, MINNESOTA

TAKE OUR CUSTOMERS' *GOOD ADVICE*

REAR VIEW SHOWING
DOUBLE SPRING ACTION—
PROVIDES SMOOTH OPERATION
& AUTOMATIC TENSION TAKEUP

Start Using A&A REGISTERS

And SAVE!



No. A-32

COMPLETE FRAME AND GASKET ON ALL WALL REGISTERS

SEND FOR CATALOG

THE A & A REGISTER COMPANY
8327 CLINTON RD. CLEVELAND 9, OHIO

John E. Brecht Co. of Cincinnati to cover Ohio, Indiana, and Kentucky.

A. E. Olson of Minneapolis to cover Minnesota.

Owen Engineering Co. of Carbondale, Ill., to cover Southern Illinois, Eastern Missouri, and Arkansas and Tennessee.

H. J. Waff, Jr. of Norfolk to cover Virginia, West Virginia, North and South Carolina.

This now gives Steinen eight field representatives covering twenty-five states.

D. S. Smith

George McCuskey

D. S. SMITH was elected president and chairman of the board of directors of Perfection Stove Co., at the annual meeting of the Board. He replaces L. S. Chadwick whose retirement was recently announced.

Mr. Smith came to Perfection following completion of his schooling in 1910. The company was then known as the Cleveland Foundry Company and Smith's first job was as a clerk in the cost department.

Successively advanced in the organization, Smith was elected vice-president and treasurer in 1949, and executive vice-president and treasurer the following year.

The board also elected George McCuskey secretary and treasurer of the company. Mr. McCuskey joined the Perfection staff as assistant counsel in the legal department in 1944. He was named general counsel in 1946 and elected assistant treasurer in 1950. Before coming with Perfection, McCuskey was associate wage stabilization director with the War Labor Board, and an investment analyst for Boyd & Co.

He also was one of the organizers and a former president of the Massillon Aluminum Co. before it was taken over by the Exco Products Co. a few years ago. He was an organizer and vice-president of the Peoples Federal Savings & Loan Co., and a member of the Massillon Board of Trade.

DIAMOND IRON WORKS, INC., Minneapolis, Minn., has announced the purchase of the Stokol line of mechanical coal fired stokers from Chrysler Corp., Airtemp Division, Detroit, Mich. All future manufacturing, sales and distribution rights accrue to Diamond as a result of the outright purchase.

The action was prompted, according to J. P. Blaul, executive vice president of Diamond Iron, in order to 1) offer better service to their distributors and dealers,

Over 50,000,000 ft. in service!
For more than 20 years, Johns-Manville Transite* Flue Pipe has proved its dependability and economy in thousands of installations throughout the country. To date, there have been more than 50,000,000 feet of this asbestos-cement pipe used for flue pipe installations!
For complete details, write for Folder TR-84A. Address Johns-Manville, Box 290, New York 16, N. Y.
*Reg. U. S. Pat. Off.
UL
JM
Johns-Manville TRANSITE FLUE PIPE
FOR VENTING DOMESTIC GAS-BURNING APPLIANCES

International
SAINT LOUIS
RADIANT PERIMETER HEATING
The most wonderful heat we ever used... saves 30% on our heating budget!
says William Schuster
Wilrad Corp., Erie, Pa.
International
SAINT LOUIS
Original Developers of
Radiant Perimeter Heating...
Manufacturers of Oil and
Gas Burning Furnaces
● All the advantages of radiant heat plus greater uniformity, instantaneous response to thermostat control plus filtered and conditioned air circulation throughout your homes.
● Requires less than four square feet of floor space.
● Saves up to 30% and more on your heating budget.

Amazing new method of heating homes tested and approved by the National Warm Heating and Air Conditioning Association in conjunction with the University of Illinois, as well as in thousands of homes. Provides heat at floors with a blanket of warmth at outside walls. Builders all over the country are adapting this revolutionary new way of heating their homes at lower cost—and better than ever before.

READ WHAT THESE AUTHORITATIVE PUBLICATIONS HAVE TO SAY ABOUT THE NEW HEATING SYSTEM WITH INTERNATIONAL FURNACES . . .

HOUSE & GARDEN: "combines advantages of a radiant floor panel and a warm air system . . . envelopes outside windows and walls in warmth."

PRACTICAL BUILDER: "especially well adapted for basementless houses . . . economical . . . very compact furnace."

AMERICAN BUILDER: "answers need for low-cost heating method . . . blower is cradled in resilient springs, permitting operation without hum or vibration."

ARCHITECTURAL FORUM: "sets a stiff pace in the economy house field."

LIVING: "This system has many advantages . . . outlets under windows . . . low initial and installation costs . . . warms quickly."

Send for details on how you can heat your homes better at lower cost. Enclose your plans and we will send estimate and cost of installation.

International SAINT LOUIS **OIL BURNER CO.**
3820 Park Ave., St. Louis 10, Mo.

MAKE YOURS A

Year-round Business

with slack-season Furnace Cleaning jobs!

NEW furnace and boiler cleaning jobs . . . and repeat business from satisfied customers . . . that's where G-E Furnace Cleaners pay off royally.

Your spring and summer slump can be *busy* and *profitable* seasons for you if you take advantage of what these modern G-E cleaners have to offer. With a little effort on your part they will do more than their share toward keeping your crews *profitably busy* during the slack fuel season.

And these cleaners are compact, powerful, efficient . . . easy to operate and move about. They surely help you do the work and do it *well* while cutting your cleaning time.

Here's an ideal way to increase your annual volume.

Each unit converts quickly to powerful *blower* action for loosening soot in stubborn corners. Special G-E Furnace and Boiler cleaning equipment includes Chimney Flue Brush, Duct Brush, Shield, Crank and 32 feet of extensions.

MAIL COUPON FOR DETAILS

Furnace and Boiler Cleaners

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, Dept. 22-4120
1285 Boston Ave., Bridgeport 2, Conn.
Without obligation, please send complete details on heavy-duty cleaning equipment.

NAME _____
FIRM _____
ADDRESS _____
CITY _____ STATE _____

THE TREND IS TO
WAYNE
FOR BEAUTY
AND ECONOMY
WAYNE
HOME EQUIPMENT
TO HOT RUNS - ALL ROOMS
FREE!
WAYNE "DREAM HOME" FOLDER WITH HEATING DETAILS ON THIS JOB
Millions of home planners and owners are reading about Wayne installations like this one in Better Homes and Gardens, and many other magazines.
HOUSE FLOOR LEVEL 8" ABOVE SLAB
COLD AIR REGISTER
HOUSE GARAGE PARTITION
FURNACE
WAYNE
WINTER CONDITIONERS ARE WHITE BAKED ENAMEL TO MATCH APPLIANCES
WAYNE DEALERS PROFIT MORE
Learn why Wayne sales are booming . . . how you can get the Wayne line for MORE profits. With Wayne you'll have a COMPLETE heating line acceptable to MORE prospects.
UL
WRITE FOR 1951 CATALOG
WAYNE HOME Heating EQUIPMENT
IN ALL SIZES
WINTER CONDITIONERS • FURNACES • GAS-OIL BURNERS
GET WAYNE NOW!
Act NOW to strengthen your supply and sales position. Consider the continuous demand for Wayne home equipment. Get set now—with Wayne—for more sales this year and in future years.
• Write For Exclusive Wayne Franchise Details.
FOR GREATER SALES AND PROFIT IN 1951
FOR GREATER SALES AND PROFIT IN 1952
1953
1954
1955
WAYNE HOME EQUIPMENT CO., INC.
800 GLASGOW AVE., FORT WAYNE 4, INDIANA

and 2) to expand existing distribution outlets. The name Diamond Stokol will identify all future merchandising efforts on behalf of Diamond stokers.

Diamond Iron Works, Inc. will continue to produce a complete line of bin and hopper feed stokers in both bituminous and anthracite models for commercial and domestic uses.

APPOINTMENT OF Ruth I. Shafer, one of the two women members of the American Society of Heating and Ventilating Engineers, as eastern division manager of Overhead Heaters, Inc., was announced here by President T. E. Trese.

From the company's newly-opened New York headquarters at 521 Fifth Avenue, Miss Shafer will be in charge of sales in the eastern seaboard states from Maine to Florida. The Overhead company, located in Detroit, manufactures horizontal oil-fired heaters for commercial and industrial use.

Miss Shafer has been in the heating equipment business for 10 years in New York. Prior to joining Overhead Heaters, Inc., she had been an officer and director of Paco Products, Inc., and Bossi Company, New York metropolitan area distributors and jobbers for manufacturers of heating equipment and controls.

A native of Brooklyn, Miss Shafer was graduated from the University of Wisconsin with an A.B. degree in 1934.

M. A. STRAUB, sales manager of Norge Heat division, Borg-Warner Corp. has announced the appointment of two new regional managers, Fred Potter and Ralph E. Rawles.

Mr. Potter will handle the territory that includes Kansas, Missouri, southern Illinois, Oklahoma, Texas, Arkansas, Louisiana, and Mississippi. He has a long

Ralph E. Rawles

Fred Potter

record in the heating industry. Formerly with Kalamazoo Stove and Furnace Co., he later was associated with Dade Drydock Corp., and the Dade Distributing Co., wholesale distributors of heating equipment.

The territory administered by Mr. Rawles will include Virginia, Kentucky, Tennessee, Alabama, Georgia, Florida, and North and South Carolina. He had previously been southern manager for the stoker and heating division of Fairbanks-Morse & Co. His experience in the heating field dates back to 1926 when he was associated with the Virginia Electric & Power Co.

Mr. Potter resides in St. Louis, Mo., and Mr. Rawles in Norfolk, Va.

- Precision-made by skilled artisans
- Saves labor on the job
- Packed and shipped in convenient cartons
- Carried in stock by leading wholesalers

Install furnace pipes, ducts, and fittings the easiest and most efficient way—with Ohio Valley. Cartons are clearly marked as to size and quantity, parts fit snugly, and the ease of installation saves you time and enables you to make more profit on every job.

Ohio Valley Hardware & Roofing Company
Metal Manufacturing Division
Evansville 2, Indiana

PORTABLE TEMPERATURE RECORDER . . .

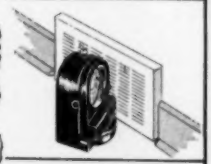
Indispensable for SALES, INSTALLATION and SERVICE

"Very useful for selling installation jobs."

"Very satisfactory for recording outdoor temperature for 'degree day' operations."

"Makes it easy to check proper thermostat location."

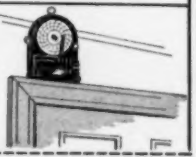
"Used all the time for balancing heating systems."



"Gives me proof of a good installation."

"Has been invaluable as proof in settling heating complaints."

"Helped me discover incorrect 'night set-back' of clock thermostat in seconds instead of hours."



The **TEMPSCRIBE** Temperature Recorder gives continuous time-temperature records of room temperature or of air temperature at any specific point, such as at the thermostat, at floor and ceiling levels, and above the radiators or in front of warm air registers. The temperature graph, as recorded on a 4" chart, shows at a glance the highest and lowest temperature during the test period, duration of any temperature extreme, and frequency and spread of temperature fluctuations. The instrument is compact, self-contained; no electrical connection; requires no watching. Can be stood anywhere or hung on wall. Available in ranges to cover —30° F. to +160° F. temperatures. Choice of spring wound chart drives: 8 hour, 24 hour, or 7 day rotation.

BACHARACH INDUSTRIAL INSTRUMENT CO.
7000 Bennett Street · Pittsburgh 8, Pa.

Ask your jobber about TEMPSCRIBE Recorders, or mail coupon for Bulletin 720

Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, Pa.
Send Bulletin 720 on TEMPSCRIBE Recorders to:

Name_____
Company_____
Street_____
City and State_____
We are: ☐ DEALER ☐ JOBBER ☐ MANUFACTURER

DANIEL F. MAGNER has joined the staff of the machinery division, Dravo Corp., Pittsburgh, as a sales engineer with the heating department. He will be stationed in Washington, D. C., with offices in the DuPont Circle building.

Daniel Magner

Before joining the company, Mr. Magner was with Lynch-Wilde & Co., export associates of Dravo. In his new position Mr. Magner will handle sales and applications of Dravo counterflow direct-fired space heaters in the Washington area.

Another recent Dravo appointment involved Morris L. Hicks who was made manager of the Philadelphia district office. Mr. Hicks has been associated with the company since 1932.

THREE NEW INDUSTRIAL managers and 18 additional men have been assigned by Minneapolis-Honeywell Regulator Co. to the field staff of its Brown Instrument division, it was announced by William H. Steinkamp, field sales manager of the industrial division.

Joseph H. Matulis has been named industrial manager of Honeywell's Chicago branch. Willard Smith of the Pittsburgh branch, and Joseph H. Bowman of the Buffalo office.

The men added to the field staff were:

Merle O. Evers has been assigned to the San Francisco office; Frank J. Stevens to Los Angeles; William R. Coffman, Kansas City; Edward I. Espy, Pittsburgh; Robert R. Stalnaker, Denver; Richard G. Daniels, Washington; Cyril L. Griesbaum, St. Louis; Donald J. Nankervis and Daniel Miller, Chicago; Lawrence R. Keenan, East Orange, N. J.; Paul E. McKenzie, Louisville; Donald D. Russell, Twin City; Edgar M. Corson, Milwaukee; Harry F. Ogden, Dallas.

Also William S. Stroud, Knoxville; Louis D. Gercken, Charlotte; Harry L. Kay, Richmond, and John Morrison, Greenville.

Kruckman—

(From page 70)

All this, and many other details not here discussed, are part of the pattern of regimentation which is being imposed upon us daily, either after a manner that we can perceive, or in various ways that are obscure and that we do not sense. It is rather shocking to find that the President is attempting to take over such an agency, independent and responsible only to Congress, as the Federal Reserve system, one of the most important instruments of our government. It can easily be understood what may happen to us when we no longer have any remote control over our finance and our credit. It is apparent why Chairman McCabe adroitly eased out of the picture.

fits any pocket-book

ROYAL JET-FLOW *selected for "Better Homes and Gardens" $20,000 Five Star Home No. 2004—Designed and built by Cliff May.*

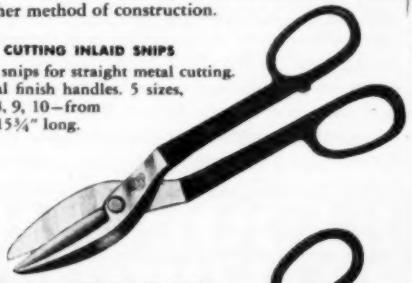
ROYAL JET-FLOW *selected for 451 homes for Negroes built by Folmar-Flinn in Montgomery, Alabama. House and lot complete sells for $5200.*

Write to Royal Heaters, Inc., Alhambra, Calif., for complete information on AMERICA'S OUTSTANDING HEATING UNIT—THE ROYAL JET-FLOW.

The best name in snips is WISS

WISS metal-cutting snips are carried by leading supply distributors. There is a WISS snip for every purpose. WISS Inlaid Snips are made of two kinds of steel, a super-tough hot dropped forged frame to which is welded a high carbon crucible steel blade providing toughness and sharpness superior to any other method of construction.

STRAIGHT CUTTING INLAID SNIPS
The basic snips for straight metal cutting. Gun Metal finish handles. 5 sizes, #6½, 7, 8, 9, 10—from 11½" to 15¾" long.



COMBINATION CUTTING INLAID SNIPS
Straight blades, but ground and shaped so they readily cut curves and irregular shapes as well as straight. 3 sizes, #17, 18 and 19—from 12½" to 14½" long.

#5 BULLDOG HEAVY DUTY INLAID SNIPS
For cutting tough alloys—monel metal, stainless steel, Allegheny metal. Invaluable for bench work for notching and cutting strap iron bands. 17" long, 2½" cut.

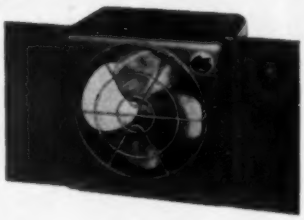
WISS snips are produced largely by the hand work of skilled workers. Each pair is rigidly tested and guaranteed perfect. Bolts are set precisely to reduce wear and to increase cutting power with minimum effort. Blades are adjusted carefully and will remain in adjustment for an unusually long time, even with hard use. Edges have a special bevel which contributes to the ease of cutting, yet assures lasting sharpness.

Quality for over a century

J. WISS & SONS CO., NEWARK 17, N. J.

3 GOOD REASONS WHY . . .

SNO-BREZE AIR COOLERS



. . . are preferred EVERYWHERE!

Forty-two years of air-conditioning know-how back every Sno-Breze—a perennial leader.

Sno-Breze is field performance tested for complete customer satisfaction—a worthy favorite of architects, engineers, and builders.

and now

Sno-Breze has been awarded the Good Housekeeping Seal of Approval and Guarantee—the buying guide of millions for securing the best product value—a climaxing vote of confidence for America's No. 1 cooler—Sno-Breze.

Note: The tremendous, ever-increasing demand for Sno-Breze through our established outlets limits new franchises to certain markets. You may be located in one of these areas. SO WRITE TODAY for further information on this lucrative line.

PALMER MANUFACTURING CORPORATION
DEPT. A-2
Phoenix • Los Angeles • Lubbock & Dallas, Texas

BEST for new installations...
BEST for conversions...
BEST for Gas-tight,
Smoke-tight joints in
ANY installation!

FAST . . .
LEAK PROOF . . .
PERMANENT . . .
LOW COST!

Only the finest high temperature refractories and binder materials are used in the manufacture of Grant Wilson Asbestos Furnace Cement—and expert blending and compounding, plus years of "know-how" assure easy workability. It is a proven product which has been tested and accepted and is in daily use by the most exacting Builders and Installers in the Industry.

Thoroughly fireproof, smokeless, odorless and acid-proof, it is ideally suited for use in oil, gas or coal-fired heating units. It's easy to get out of the can—easy to trowel in place—smooth to work, AND IT STAYS PUT.

Buy it from your jobber or write for free sample A-4
GRANT WILSON, INC., Board of Trade Bldg., Chicago 4, Ill.

Grant Wilson inc.
ASBESTOS and INSULATING MATERIALS

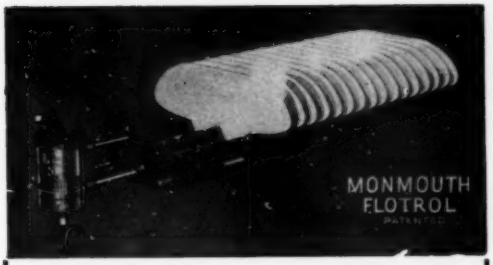
What the new chairman may do is very much a puzzle. William McChesney Martin was once president of the New York Stock Exchange. His father helped to found the Federal Reserve system, and later was the head of one of its district banks. Martin spent all his working life in the field of finance. He must know the dangers of inflation and the part that an independent Federal Reserve System, with its controls over credit, can play in the further cheapening of the dollar. It remains to be seen whether Martin, coming from the Treasury where he was Assistant Secretary of the Treasury, and close to Snyder, will simply be the President's man or whether he will try to preserve the integrity of the Federal Reserve system. Martin is said to be a man with a good mind, a facility for expressing himself, and with diplomatic qualities. He is supposed to have played a major role in the establishment of the recent Treasury-Federal Reserve accord. On the face of it Snyder lost out. But you cannot tell from the vague facts that have reached us. It does seem clear that the Federal Reserve is not obliged to support government securities as demanded by Snyder. Incidentally, the calamities that were predicted upon such action have not happened. It will be to the interests of every businessman to carefully watch what happens in the relations between the Treasury, the Federal Reserve system, the White House and Congress.

Wilson Undermined

Defense Mobilizer Charles E. Wilson may not be long in this government. Truman has done to him almost precisely what he did to Stuart Symington. Contrary to the promises he made to him, he has shorn him of his ultimate authority. The new National Advisory Board on Mobilization Policy becomes, in essence, Wilson's boss. It stands between him and the President.

There will be sixteen members on the board. They will be chosen by the White House. Four will be chosen to represent labor, four to represent the farm groups, and four to represent business management. The other four will represent the general public. This is the familiar pattern which has been followed in similar boards since Truman became President. The word has already come out on the grapevine that the four who will represent the general public will be chosen from among the most liberal friends of the Fair Deal, individuals who may be expected to be entirely sympathetic with the ambitions of labor. In this way labor gets what it has been fighting for, the power to dominate the policy of the defense activities. Ex-Senator Joe Ball, one of the shrewdest observers in Washington, voices the belief that this means labor has taken a tremendous stride forward in its program to set up a labor government.

It takes little perspicacity to see that hereafter Wilson cannot take any definite step involving policy without the ever present need for consulting the National Advisory Board on Mobilization Policy. The board works directly with the White House. It reports directly to the President in all matters of the policy upon which it is expected



Superior features of Monmouth Humidifiers are widely recognized by heating experts. Genuine Monite ceramic diffusion plates, acid and heat resisting, mean rapid water absorption, free vapor diffusion, easy cleaning. Monmouth models are designed for quick installation, high operational efficiency. We have the complete line. Standard size Flotrols and No. 310 (Junior size) have the famous Flotrol control valve. We also make the Micro-Feed, the simple, low-cost model for drip feed, and the Monmouth Humidity Conditioner, a gas-operated unit for use with radiator heating jobs. Full details on request.

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MONMOUTH HUMIDIFIERS

THE RIGHT SHEARS FOR ANY CUTTING JOB

MARSHALLTOWN

ROTARY
THROATLESS
SHEARS

CUTS ALL SHAPES—SIZES

- QUICKER
- EASIER
- FASTER

Here's a shears that's right for every job. Speedy — efficient. Cuts up to ¼ inch stock — speed to 6 ft. per minute. Excellent for irregular cutting or straight splitting. Available in hand operated or motorized models. Prompt shipment. Send today for special illustrated bulletin.

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H&C Kwik-way DAMPER

REGULATOR SETS

THE FINEST SETS . . . and MOST INEXPENSIVE, INSTALLED!

One hammer-blow is all that is necessary to solidly fasten the bearing to the damper. No anvil is required. Identical bearings with retractable bolt make easier installation of both regular and splitter dampers in round and square ducts. The time these sets save plus the fact they are complete — with handle — makes them by far the most economical of all sets when installed cost is considered. See your jobber or write us for literature.

LIST PRICES

FOR MEDIUM DAMPERS		FOR LARGE DAMPERS	
No. 70 Set	.30c	No. 50½ Set	.40c
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AUTOMATIC

CEILING SHUTTER

FOR ATTIC FAN

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Illustrations and details of the complete AIR-FLO line.

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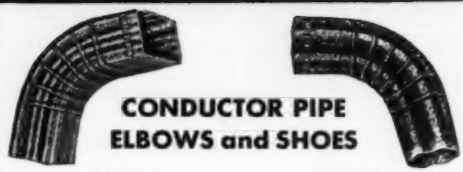

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- ALL SIZES
- ALL GAUGES
- ALL ANGLES
- ALL METALS

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SUBSTANTIAL PROFITS *for* **YOU—**
Cleaning Furnaces with the **GRAND RAPIDS** *De Luxe* **FURNACE CLEANER**

You can put furnace cleaning on a money making basis by using a Grand Rapids Furnace Cleaner. High velocity suction scoops up all deposits of soot, ashes and carbon, cleaning the heating plant and re-establishing full efficiency. Special attachments clean flues, radiators, right angle turns and other hard-to-reach areas. The job is done quickly and completely. Customers are highly satisfied.

The Grand Rapids DeLuxe Furnace Cleaner is also your "in" for more than cleaning profits. By checking over and inspecting the heating plant as you clean it you are in a position to make timely recommendations for new equipment or repairs. This means better service for customers . . . more profits for you.

Write for complete information and prices today.

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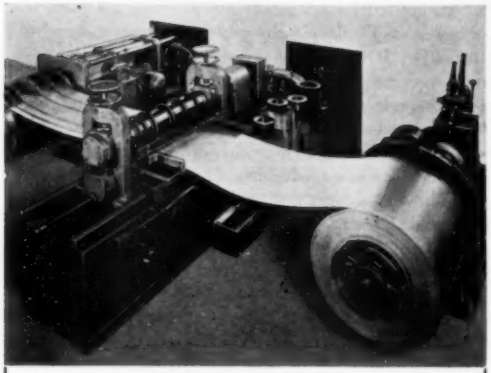
to give advice. And logically, it will give advice on all developments that involve any phase of policy. The magnitude of the scope of what is implied must be obvious. For instance, Wilson never again will be able to take such action as he took in placing Dr. Flemming at the head of the manpower board. If the advisory board had been in existence at that time he would probably have been compelled to comply with the wishes of the labor group to turn over manpower policy-making to Labor Secretary Maurice Tobin. Otherwise he would have been forced to resign. Although the board may consist of quite ordinary individuals, it will inevitably have tremendous prestige. The group that makes policy for the entire scheme of defense mobilization is the group that will set the pace for our industrial, social, political, and military life during this emergency. Unless Truman has simply created another bit of superfluous scenery, you cannot escape this conclusion. And indications are that labor will control the new board.

The incident is bound to have a profound effect upon the future history of the country. Should Truman run again in 1952, and should he be elected, it will clearly be chiefly by sufferance of labor. This means they will now gradually infiltrate into the key places, and those offices from which the destiny of the nation is controlled. Does it not behoove those who are responsible for the fate of the industry of the nation, as well as for its social and political future, to watch carefully, and to oppose anything that seems a further usurpation of those powers that will more completely take this country down the road which the British have so tragically travelled. Do we want to be in the position of being rationed to one egg in four weeks, and nine cents worth of meat per week?

His Own Rules

It is common knowledge in Washington when Mr. Wilson was asked to take the job of Defense Mobilizer he was told he was expected to serve under the general supervision of W. Stuart Symington, chairman of the National Security Resources Board. He was told it was expected he would report to Mr. Symington, who, in turn, would report to the President on economic problems and all other plans and programs concerned with defense mobilization. It will be recalled that Symington, at that time, was top man in the emergency organization. He outranked General William Henry Harrison, Commerce Secretary William Sawyer and Labor Secretary Maurice Tobin. Symington was in and out of the White House eight or ten times a day. He was generally regarded as the man of destiny. And, he had the good will and sympathy of most of those who knew the ropes in Washington. There is a quality about Symington that has a great deal of appeal. He had made an extraordinary reputation as the first head of the Air Force.

But Wilson wouldn't play. He told Truman he would accept the job only if he was responsible to no one but Truman. The President was on the spot. The whole defense mobilization mess had aroused public indignation.



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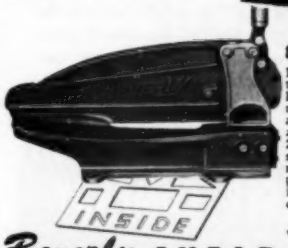
BEVERLY SHEARS SAVE TIME · LABOR · MATERIAL

Make any cut—curved, straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear. You can turn work to *any* position and make a clean cut as you go. Handles heavy gauges with ease—lighter metals without distortion. 4 models—capacities 18 gauge to 3/16" mild.

S-3 with Ball Bearing Hold Down



INSIDE SLOTTER

8" Reach—16 ga. capacity

Makes inside slotting cutting faster, easier, cleaner. Punch and die arrangement of 5 blades assures accuracy, clean cutting action. Cuts 2½" x 1/8" or 2½" x 1/16" slot at one stroke. Throat design permits pivoting work at any point in stroke for special inside cuts. Note sample cuts at left.

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OIL BURNER

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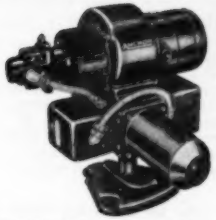

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MAY-FIEBEGER COMPANY
MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR OVER 50 YEARS
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The Man with a Red Streak Makes More Money

● Our FREE Super Sales Plan Book Tells You How

With potential shortages near, now is the time to establish a furnace cleaning business. A Super Red Streak Furnace Cleaner pays off big because it is fast, thorough, requires practically no upkeep expense. It comes equipped with chimney cleaning tools. Efficient suction tube scrapers are available for fire tube boilers. The Super Oil Soot Filter Bag for oil burning furnace cleaning may be obtained at a small extra cost.

Ask your supply dealer or write for our 5-day FREE trial offer. See for yourself why so many have done a better business the Red Streak way.

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SUPER SUCTION®
SINCE 1911
"THE DRAFT HORSE OF POWER SUCTION CLEANERS"

So, abruptly, Symington was pushed from his place of eminence, and suddenly shoved back to almost complete obscurity. It was one of the most abrupt and startling shifts in the story of the Truman administration. It was a good example of the truth of the old adage not to pin your faith on kings. Also, it was probably one of the reasons why Truman became so nervously exasperated. The President naturally is a kindly man. It is unnatural for him to do the sort of thing that he did to Symington. It must have made Truman wince to see how Wilson, without so much as by your leave, grabbed the offices in the old State Department building occupied by Symington's personnel. Wilson even took over Symington's staff. In effect, Symington largely became an official with a high-sounding title but without an organization, almost without an office to hang his hat. One day he was Truman's favorite, the next day, after he had been demoted, Truman apparently did not know he existed. There was, for a few weeks, an effort to cover up the unhappy situation by suggesting that Symington would become Secretary of Defense when Marshall retired in the near future because Marshall is finding the burden too great for his 70 years.

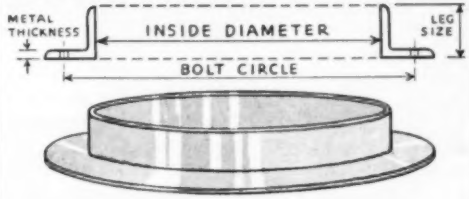
The Palace Guard

Symington's fall from grace is attributed to the same influences in the White House that have finally put the hobbles on Wilson. There is a group in the White House crowd which constantly guards against the bestowal of too much power on any individual who comes into the emergency government. The group consists of adroit political manipulators, skilled technically in the art, but with practically no imagination, little idealism and a great deal of narrow, limited, personal selfishness. It is this group which has made mink coats fashionable, and which has dragged RFC down to a depth in political and governmental shoddiness that is unparalleled in the history of the United States. Only the surface of the deterioration and degradation of that agency has been presented in the public hearings.

The drama of Wilson is ahead. If he takes what Symington took it will not be the Wilson whom his friends have known during his half century with General Electric. Wilson comes from New York's Hell's Kitchen, is a tough fighter, and has a sort of Bull of Bashan robustness. He will not be pushed around. He is big in vital force and in person. He has courage and much pride. It is almost certain, if he cannot make Truman live up to his agreement, Wilson will quit. It is in the cards, when Wilson quits, — if he quits — as a casualty of the Battle of Washington, attempts will be made to smear him as so many others leaving the government have been smeared.

Thirty manufacturers of the nation were here recently to find out what OPS Administrator Michael DiSalle intended to do about the proposed price regulation for manufacturers. The meeting was largely a stalemate. They were told they would be limited, probably, to price

ANGLE RINGS *to Order*



Send Us Your Dimensions

Fill out the above dimensions and we can give you an immediate quote in any quantity desired. Accurately rolled to specifications with open or welded joints—with or without bolt or rivet holes.

We also roll tees, flats, rounds, channels, pipe and tube, into rings or ring segments. Uses: Joining pipe or smoke stack sections; Reinforcing rims for tanks, vats, drums or circular guards; Blow Pipe work and other installations.

Write for our list of stock sizes and discounts—also our circular describing our fabricating services.

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National Metal Fabricators

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Midco Register Corp.
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Registers — Grilles — Floor Faces — Floor Registers — Gravity Registers. The complete quality line for all winter and summer air conditioning.

A "Double Feature" BURNER

The Siemon Gas Burner is an extremely efficient heavy duty burner, which can be installed as a straight gas burner or in combination with an oil burner, or oil can be added later. Maximum dependability and economy — completely automatic.

Siemon Combi-Matic BURNER
COMBINES OIL WITH GAS

NEW CONVERSION BURNER

A conversion burner with many new features at an economical price offering maximum efficiency.

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NEW STANDFORATED
PERFORATION OF ALL METALS

"BEND-EZY"

FORCED AIR REGISTERS and GRILLES

Smartly Styled . . . Efficiently Designed for Sidewall and Baseboard Installations

The Standforated "Bend-Ezy" sidewall registers are stamped from sheet metal and have horizontal bendable bars, set at time of fabrication for 30 degree downward deflection. Each bar can be easily readjusted with a "Bend-Ezy" tool to any angle for upward, downward or straight flow.

Illustrates how easy it is to set the bars with a "Bend-Ezy" tool. SINGLE DAMPER REGISTERS with bendable bars

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Contains complete information—fully illustrated

- **FLOOR REGISTERS, One-piece frame construction.**
- **GRAVITY BASEBOARD REGISTERS**
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- **PERFORATED METALS FOR EVERY INDUSTRIAL USE**

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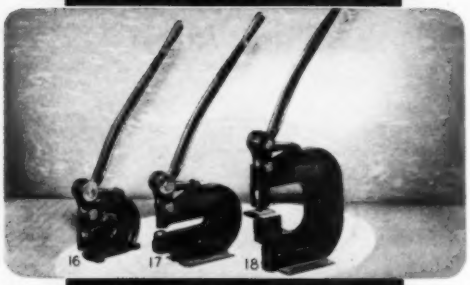
WHITNEY METAL
TOOL COMPANY
41 YEARS EXPERIENCE



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BENCH PUNCHES

Roller-bearing, lever-type punches designed for bench use. No. 18 has higher and deeper throat than Nos. 16 and 17; comes with adjustable die shoes to permit use of close-fitting punches and dies. Capacity: — mild steel: (No. 16 — 3/8" thru 1/4"), (No. 17 — 1/4" thru 1/4"), (No. 18 — thru 12 ga.).

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increases of 5 per cent above present levels, or 10 per cent above pro-Korean levels, whichever is higher. The regulation is to be temporary to be used while OPS works out a law which it deems more permanently applicable. Manufacturers' prices are to be fixed on the basis of increase in costs, limited to the expense for materials and for labor.

It is quite certain the rollback, generally, will be long before January 26, 1951. Administrator DiSalle laid it down as axiomatic that all prices would be rolled back as far as might be justified; there were many intimations that in numerous instances June, 1950, would figure as the rollback standard. Each company will have to justify its labor and materials costs. Those with small cost increases, if there are any, will be held to less than the 5 per cent and 10 per cent maximum. Labor costs may be fixed as of today while materials costs wills be gauged as of January 31, 1951. The order, in all likelihood, will be promulgated, either late in March or early in April.

If you are subject to OPS Regulation 7 consider this:

> "On and after April 28, 1951, you may not offer, sell or deliver any article covered by this regulation until you have received from the OPS an acknowledgment of the filing of your chart (of prices)."

If every article you sell comes under Regulation 7 you must have an acknowledgment of the filing of your chart before April 28. Without such acknowledgment

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for
DIECKMANN
ELBOWS
and
SHOES

"An angle for every obstacle"

Made in 28, 26 and 24 gauge steel, hot dipped galvanized after formation. Also in Copper, Aluminum and Stainless Steel.

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Sizes 1" to 6"—Angles 10 to 90 degrees.
Always uniform in size and angle

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One piece tapered with no protruding seams—a perfect and tight fit with any conductor pipe without soldering.

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Established 1871
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Plain Round

Round Corrugated

Square Corrugated Style "A"

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NO PROBLEM
WITH PENN

For most efficient ventilation in all types of buildings — wise contractors buy Penn Ventilators . . . the true rotary, air-drive suction turbine that works automatically, continuously, silently without maintenance or operating expense.
Used extensively throughout the world, Penn Turbine Ventilators can solve your ventilating problems — quickly, efficiently, economically.

YOUR LOCAL JOBBER STOCKS PENN VENTILATORS IN ALL SIZES

JOBBERS: WRITE FOR PROFITABLE DISTRIBUTORS' SET-UP

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ALLEGHENY AND GOODMAN
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Just a breeze

...keeps **Western Rotary Turbine Ventilators** in operation, providing constant 'round-the-clock exhaust. Western's lifetime-guaranteed bearings are both mounted on the same axis...always stay in alignment...stand up to shipping jolts. Throat sizes from 6" through 48". The typical, clean, attractive silhouette that progressive industry demands. Western turbo-ventilation...high in efficiency, low in cost.

Request our catalogue for information, sizes, capacities, price lists. In 1951 Sweets and A. E. C. Jobbers are invited to participate in our national sales system.

"Always on the job—never on the payroll"

WESTERN ENGINEERING & MFG. CO.
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FASTER INSTALLATION CUTS LABOR COSTS . . . BOOSTS PROFITS

Our precision made fittings will cut the time required for installation on all your furnace jobs. With continuing shortages of men and materials the most efficient way to operate a shop is to use Youngstown fittings. Your crews will get more done because Youngstown fittings assemble easily and fit accurately.

Contact your jobber today for the fittings that mean more profit and less work for you.

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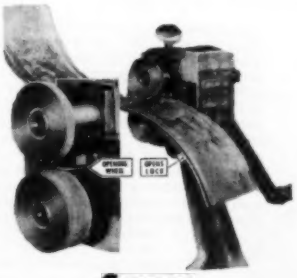
AT LAST *BIRKS*

Pittsburgh Lock Opener *OPENS*

Curved or Straight Sections for easy assembling



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Time . . . Labor . . . Injury

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BRISTOL METAL WORKING EQUIP.

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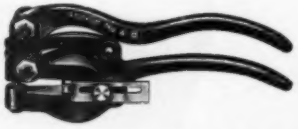
WHOLESALERS—order sample at maximum discount

A REAL *Time Saver*



The No. 4B PUNCH by *Whitney*

This punch is accepted by leading contractors and dealers as a real time-saver in the shop and on the job. Men who use it every day know it can't be beat for clean, fast punching. Has a capacity of ¼" through 16 ga., weight 3 pounds. 8½" in length, depth of throat, 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD ILL.

ONE WASHER INSTEAD OF TWO WITH WEATHERSEAL!

The Weatherseal Washer combines a metal and a compressive, sealing washer, hydraulically bonded and "cured" together to provide just one piece to handle. The compressive material is composition rubber or neoprene, and it does a real job of sealing as this actual cutaway photo shows:

Note that the neoprene is extruded under compression to completely seal the outer edge of the metal washer as well as the fastener shank, through the metal sheets to the nut.

APPLICATIONS: Sheet metal roofing and siding • Auto body and chassis assembly • Sheet metal ductwork • Porcelain-to-metal assemblies.

TOPSEALS are fasteners you specify or supply—nail, bolt, sheet metal screw, etc.—assembled in our factory with Weatherseal Washers, ready for use. Reduce your inventory items with TOPSEAL! Write for sample and prices, stating your fastening or sealing problem. Proven production performance and large stocks maintained for quick shipment assures you of meeting your own production schedules.

FABRICATED PRODUCTS COMPANY
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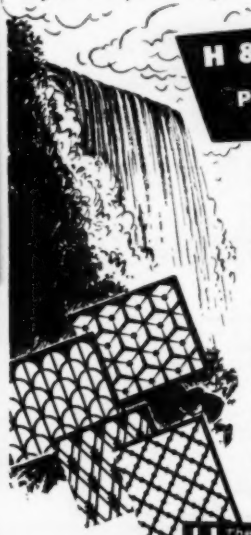
Ageless Beauty—Lifetime Utility

H & K GRILLES of PERFORATED METAL



Because of the rearmament program it is not possible at the present time to furnish metal grilles except of steel, and it is anticipated that plated finishes will not be permitted.

You still have available, however, our wide selection of patterns—classic and modern—and grilles produced in steel with painted finishes which will serve your needs satisfactorily.

Send us your specifications and our engineers will quote you prices on grilles which can be furnished in accordance with government regulations.

Also H & K Perforated Metals and Sheet Materials for Industry

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114 LIBERTY ST., NEW YORK 6, N. Y.

you must apparently refuse to sell anything pending receipt of the acknowledgment. To be perfectly certain of your situation consult a lawyer.

The House turned down the Defense Housing Bill, after cutting the finances in half and limiting it strictly to defense housing. There is little hope of a Defense Housing Bill in the near future.

Current Controls—

(*From page* 61)

Tin. NPA M-8. Second quarter, 1951

Permitted products — Pig or secondary tin can be used in the manufacture of solder for hand soldering operations with a soldering iron or torch. Limitation is that maximum tin content of the solder is 40 per cent.

Zinc. NPA M-15. Second quarter, 1951

Permitted use — Zinc producers are allowed to fill non-rated orders to the extent of 80 per cent of average use during the first half of 1950.

Prohibited products — There are no restrictions on the end-use of zinc products. However, prime western grade zinc which is required for galvanizing is in particularly short supply.

In any case where a manufacturer or contractor continues to produce prohibited items on the basis that the material was in inventory before the deadline date, it is required that complete records on that material be retained for at least 2 years.

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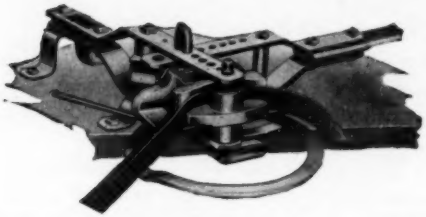

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Reid Heavy Plate Shoe Tee—

(From page 98)

E', *Q* at *F'*, *R* at *G'*, *Z* at *H'*, *Y* at *J'*, *X* at *K'*. Through the points, draw the intersecting line of the pipe and shoe tee.

Lay out the half pattern for the shoe tee as follows:

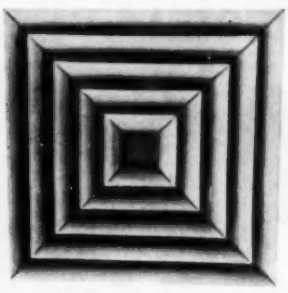
a) Draw the line *OG'*; from point *O* measure distance marked *S* establishing point *4'*, and from this point draw a line at 45 deg to line *OG'*.

b) From the simplified drawing, measure distance *Z* on line *4'-H'* and transfer this to the corresponding line on the layout and draw work line *2* as shown.

c) Transfer the distances *4*, *5*, *6*, *7* from the simplified drawing to work line *2* on the layout and through the points, draw lines parallel to line *4'-H'*.

d) From work line *2* on the drawing, measure distances *Z*, *Y*, *X*, *W*, above the line and *ZZ*, *YY*, *XX*, *WW*, below the line and transfer them to the corresponding lines on the layout.

e) From point *O* on the layout, draw line *O-1* perpendicular to line *G'-O*. This line is equal to one quarter of the shoe tee diameter in length. Divide the line into three equal spaces as shown by points *O*, *3'*, *2'*, and through the points draw lines parallel to line *O*, *G'*.



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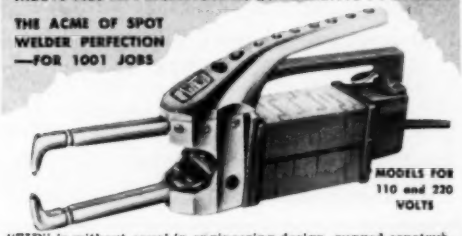

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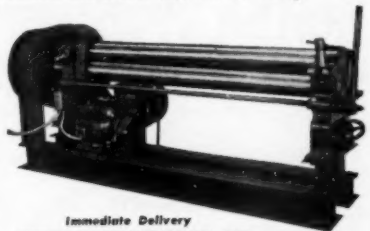

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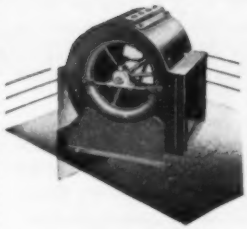

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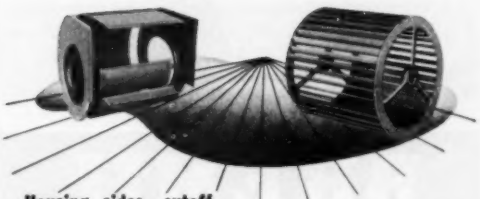

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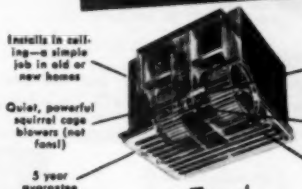
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f) Transfer the distances *M, N, Q, R* from the drawing to the corresponding lines on the layout.

g) Through the points *1, 2', 3', 0, 4', 6', 7', L, K', J', H', G', F', E', A,* draw the outline of the half pattern.

The half collar pattern is developed as follows:

a) Multiply the required shoe tee radius *SR* by 3.14 and draw a line equal to this length. Divide the line into six equal spaces and through the points, draw lines perpendicular to the stretch out line.

b) Transfer the distances *S, T, U, V* from the drawing to the corresponding lines on the layout as shown.

To lay out the true shape hole pattern:

a) Draw the line marked work line *3* and establish the point *A* on the line as shown.

b) From point *4* transfer distances *A, E, F, G, H, J, K, L,* from drawing to layout.

c) Establish work line *1* and point *A* on intersection of work lines *3* and *1*. Working from point *A*, transfer distances *A, B, C, D,* on both sides of work line *3*.

d) Draw horizontal lines through points *E, F, G, H, J, K,* on work line *3*.

e) From work line *1*, draw perpendicular lines through points *A, B, C, D,* intersecting the corresponding horizontal lines as shown. Through the intersection points, draw the outline of the hole to be cut in the pipe.

Form all patterns to required shape and weld.

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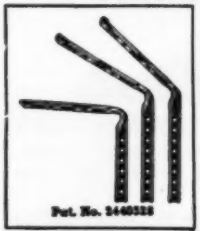

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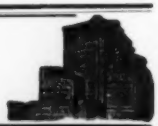

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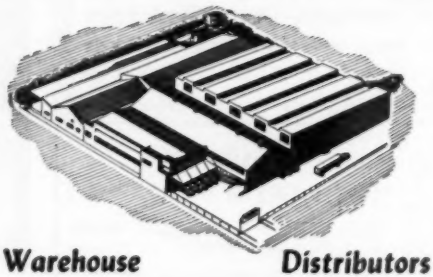

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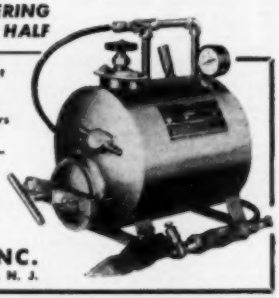

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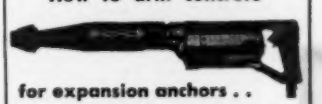

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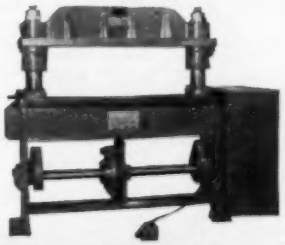

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